User's Manual

SMARTDAC+

Model GX10/GX20/GP10/GP20/GM10

Communication Command User's Manual

vigilantplant.®

YOKOGAWA
Yokogawa Electric Corporation

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5th Edition

Introduction

Thank you for purchasing the SMARTDAC+ GX10/GX20/GP10/GP20/GM10 Series (hereafter referred to as the recorder, GX, GP, or GM).
This manual explains the dedicated commands for the recorder. To ensure correct use, please read this manual thoroughly before beginning operation.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
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Revisions

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Recorder Version and Functions Described in This Manual

The contents of this manual correspond to the GX/GP with release number 2 (see the STYLE S number) and style number 1 (see the STYLE H number) and the GM with release number 2 (see the STYLE S number) and style number 1 (see the STYLE H number).

Edition	Product	Explanation
1	GX/GP: Version 1.01 and later	—
2	GX/GP: Version 1.02 and later	Feature additions.
3	GX/GP: Version 1.03 and later	Electromagnetic relay type analog input modules have been added.
		Feature additions.
4	GX/GP: Version 2.01 and later	Support for GX20/GP20 large memory type and expandable I/O has been added.
		Support for new modules (current (mA) input, low withstand voltage relay, and DI/DO) has been added.
		Feature additions. Advanced security function (/AS option) Custom display function (/CG option) EtherNet/IP communication (/E1 option) WT communication (/E2 option) Log scale function (/LG option) Etc.
5	GX/GP: Version 2.02 and later GM: Version 2.02 and later	Describes the GM.
		Feature additions. Bluetooth communication (/C8 option) [GM] USB communication [GM] Pulse input (DI module)

How to Use This Manual

This manual explains the dedicated communication commands for the recorder and how to use them. For details on the features of the recorder and how to use it, see the following manuals.

- Model GX10/GX20/GP10/GP20 Paperless Recorder First Step Guide (IM 04L51B01-02EN)
- Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual (IM 04L51B01-01EN)
- Data Acquisition System GM First Step Guide (IM 04L55B01-02EN)
- Data Acquisition System GM User's Manual (IM 04L55B01-01EN)

Conventions Used in This Manual

Unit

K	Denotes 1024. Example: 768K (file size)
k	Denotes 1000.

Markings

Improper handling or use can lead to injury to the user or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."

WARNING Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.

CAUTION Calls attention to actions or conditions that could cause light injury to the user or cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.

Note Calls attention to information that is important for the proper operation of the instrument.

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1.1 Operations over an Ethernet Network

You can control the recorder by sending commands from a PC over an Ethernet network. There are various types of commands: setting commands, output commands, operation commands, communication control commands, and instrument information output commands.

1.1.1 Preparing the Instrument

Recorder Configuration

Configure the recorder to connect to the Ethernet network that you want to use. For instructions on how to configure the recorder, see section 1.16, “Configuring the Ethernet Communication Function“ in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual* (IM 04L51B01-01EN) or section 2.17, “Configuring the Ethernet Communication Function,” in the *Data Acquisition System GM User’s Manual* (IM 04L55B01-01EN).

PC

The PC that you will use must meet the following requirements.

- The PC is connected to the Ethernet network that you want to use.
- The PC can run programs that you have created (see section 1.1.2, “Sending Commands and Receiving Responses,” below).

1.1.2 Sending Commands and Receiving Responses

Programs

When you send a command to the recorder, it will return a response. You can control the recorder by writing a program that sends commands and processes responses and then executing the program. You need to create the programs.
Example: If you send the command “FData,0,0001,0020” from your PC to the recorder, the recorder will return the most recent data of channels 0001 to 0020 in ASCII code.
For details on commands and responses, see chapter 2, “Commands and Responses.”

Notes on Creating Programs

- **When Not Using the Login Function**
  You can start using commands immediately after communication is established with the recorder.

- **When Using the Login Function**
  Log in to the recorder using a system administrator account or a normal user account that is registered in the recorder. Log in by connecting to the recorder and then sending the “CLogin” command.

- **Port Number**
  The defaul port number is “34434.” You can change the port number using the **SServer** command.

1.2 Operations over the Serial Interface (RS-232, RS-422/485, USB, Bluetooth)

You can control the recorder by sending commands from a PC through the serial interface. There are various types of commands: setting commands, output commands, operation commands, communication control commands, and instrument information output commands. Except for a few special commands, the commands are the same as those used over an Ethernet network.

1.2.1 Preparing the Instrument

Connection

See section 1.2.3, “RS-232 Connection Procedure,” section 1.2.4, “RS-422/485 Connection Procedure,” section 1.2.5, “USB Connection Procedure,” or section 1.2.6, “Bluetooth Connection Procedure.”

Recorder Configuration

Configure the recorder to use serial communication. For instructions on how to configure the recorder, see section 1.17, “Configuring the Serial Communication Function (/C2 and /C3 options)“ in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual* (IM 04L51B01-01EN) or section 2.18, “Configuring the Serial Communication Function (/C3 option),” section 2.19, “Configuring the USB Communication Function,” or section 2.20, “Configuring the Bluetooth Communication Functions,” in the *Data Acquisition System GM User’s Manual* (IM 04L55B01-01EN).

PC

The PC that you will use must meet the following requirements.

- The PC is connected to the recorder through the serial interface.
- The PC can run programs that you have created (see section 1.2.2, “Sending Commands and Receiving Responses,” below).

1.2.2 Sending Commands and Receiving Responses

Programs

When you send a command to the recorder, it will return a response. You can control the recorder by writing a program that sends commands and processes responses and then executing the program. You need to create the programs.
Example: If you send the command “FData,0,0001,0020” from your PC to the recorder, the recorder will return the most recent data of channels 0001 to 0020 in ASCII code.
For details on commands and responses, see chapter 2, “Commands and Responses.”

Notes on Creating Programs

- **For RS-232 (GX/GP), USB communication (GM), Bluetooth (GM, /C8 option)**
  When you connect a PC to the recorder through the serial interface, the recorder will be ready to receive commands.

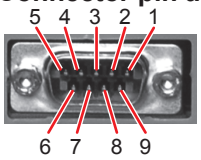
- **For RS-422/485**
  The device that receives an open command (ESC O) from a PC will be ready to receive commands. The connection will close in the following situations.
  - When the recorder receives a connection-close command (ESC C).

1.2.3 RS-232 Connection Procedure (GX/GP)

Connect a cable to the 9-pin D-sub RS-232 connector.

Connection

- **Connector pin arrangement and signal names**

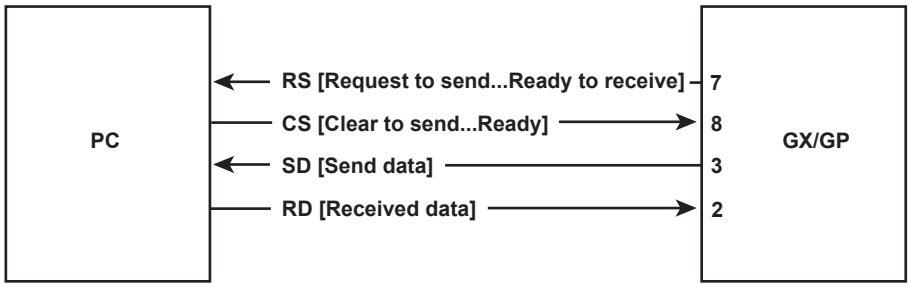


Each pin corresponds to the signal indicated below. The following table shows the signal name, RS-232 standard, JIS, and ITU-T standard signals.

Pin[1]	Signal Name			Name	Meaning
	JIS	ITU-T	RS-232		
2	RD	104	BB(RXD)	Received data	Input signal to the GX/GP.
3	SD	103	BA(TXD)	Transmitted data	Output signal from the GX/GP.
5	SG	102	AB(GND)	Signal ground	Signal ground.
7	RS	105	CA(RTS)	Request to send	Handshaking signal when receiving data from the PC. Output signal from the GX/GP.
8	CS	106	CB(CTS)	Clear to send	Handshaking signal when receiving data from the PC. Input signal to the GX/GP.

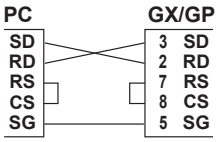
1 Pins 1, 4, 6, and 9 are not used.

- **Signal direction**

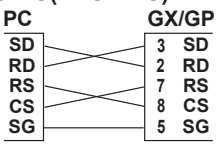


- **Connection example**

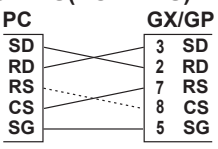
• OFF-OFF/XON-XON



• CS-RS(CTS-RTS)



• XON-RS(XON-RTS)



The connection of RS on the PC and CS on the GX/GP is not necessary. However, we recommend that you wire them so that the cable can be used in either direction.

Handshaking

When using the RS-232 interface for transferring data, it is necessary for equipment on both sides to agree on a set of rules to ensure the proper transfer of data. The set of rules is called handshaking. Because there are various handshaking methods that can be used between the GX/GP and the PC, you must make sure that the same method is chosen by both the GX/GP and the PC.
You can choose any of the four methods on the GX/GP in the table below.

Hand-shaking	Data transmission control (Control used when sending data to a PC)			Data Reception Control (Control used when receiving data from a PC)		
	Software Handshaking	Hardware Handshaking	No handshaking	Software Handshaking	Hardware Handshaking	No handshaking
OFF-OFF			Yes			Yes
XON-XON	Yes[1]			Yes[3]		
XON-RS	Yes[1]				Yes[4]	
CS-RS		Yes[2]			Yes[4]	

Yes Supported.
1 Stops transmission when X-OFF is received. Resume when X-ON is received.
2 Stops sending when CS (CTS) is false. Resumes when it is true.
3 Sends X-OFF when the receive data buffer is 3/4 full. Sends X-ON when the receive data buffer is 1/4th full.
4 Sets RS (RTS) to False when the receive data buffer is 3/4 full. Sets RS (RTS) to True when the receive data buffer becomes 1/4 full.

- **OFF-OFF**

  Data transmission control

  There is no handshaking between the GX/GP and the PC. The “X-OFF” and “X-ON” signals received from the PC are treated as data, and the CS signal is ignored.

  Data reception control

  There is no handshaking between the GX/GP and the PC. When the received buffer becomes full, all of the data that overflows are discarded.
  RS = True (fixed).

- **XON-XON**

  Data transmission control

  Software handshaking is performed between the GX/GP and the PC. When an “X-OFF” code is received while sending data to the PC, the GX/GP stops the data transmission. When the GX/GP receives the next “X-ON” code, the GX/GP resumes the data transmission. The CS signal received from the PC is ignored.

  Data reception control

  Software handshaking is performed between the GX/GP and the PC. When the amount of used area in the received buffer reaches to 3/4 full (192 bytes for R2.01 and earlier; 6144 bytes for R2.02 and later), the GX/GP sends an “X-OFF” code. Then, when the amount of used area decreases to 1/4 bytes (64 bytes for R2.01 and earlier; 2048 bytes for R2.02 and later), the GX/GP sends an “X-ON” code.
  RS = True (fixed).

- **XON-RS**

  Data transmission control

  The operation is the same as with XON-XON.

  Data reception control

  Hardware handshaking is performed between the GX/GP and the PC. When the amount of used area in the received buffer reaches to 3/4 full (192 bytes for R2.01 and earlier; 6144 bytes for R2.02 and later), the GX/GP sets “RS=False.” Then, when the amount of used area decreases to 1/4 bytes (64 bytes for R2.01 and earlier; 2048 bytes for R2.02 and later), the GX/GP sets “RS=True.”

- **CS-RS**

  Data transmission control

  Hardware handshaking is performed between the GX/GP and the PC. When the CS signal becomes False while sending data to the PC, the GX/GP stops the data transmission. When the CS signal becomes True, the GX/GP resumes the data transmission. The “X-OFF” and “X-ON” signals are treated as data.

  Data reception control

  The operation is the same as with XON-RS.

Note

- The PC program must be designed so that the received buffers of both the GX/GP and the PC do not become full.
- If you select XON-XON, send the data in ASCII format.

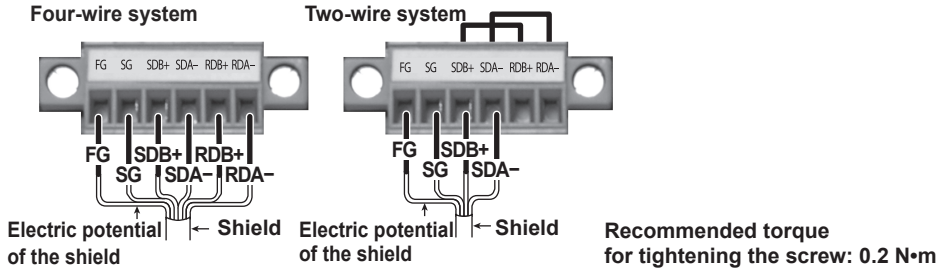
1.2.4 RS-422/485 Connection Procedure

Connect a cable to the terminal.

Connection

- **Connecting the Cable**

  As shown in the figure below, remove approximately 6 mm of the covering from the end of the cable to expose the conductor. Keep the exposed section from the end of the shield within 5 cm.



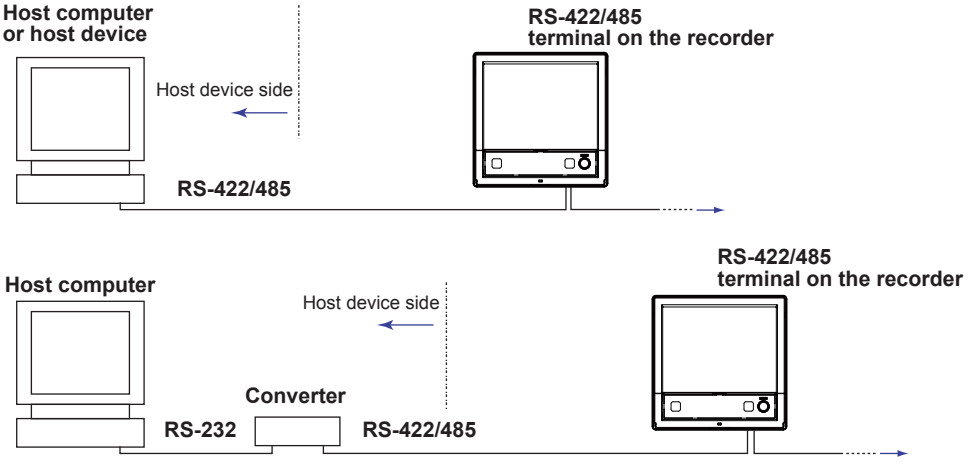
- **Signal names**

  Each terminal corresponds to the signal indicated below.

Signal Name	Meaning
FG	Frame ground of the recorder.
SG	Signal ground.
SDB+	Send data B (+).
SDA–	Send data A (–).
RDB+	Receive data B (+).
RDA–	Receive data A (–).

Connecting to the host device

The figure below illustrates the connection of the recorder to a host device. If the port on the host device is an RS-232 interface, connect a converter.



Connection example to the host device

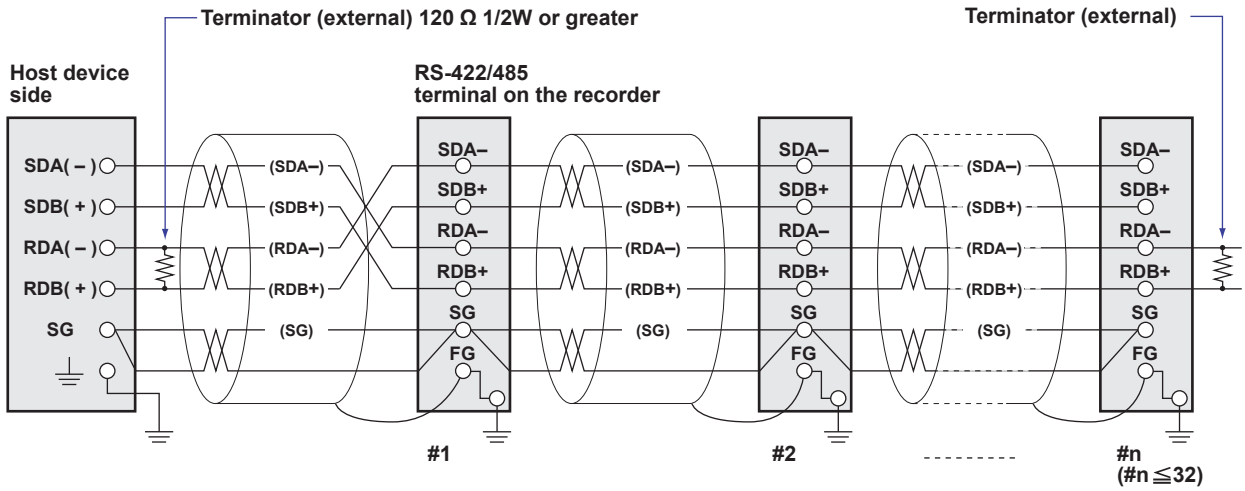
A connection can be made with a host device having a RS-232, RS422, or RS-485 port. In the case of RS-232, a converter is used. See the connection examples below for a typical converter terminal. For details, see the manual that comes with the converter.

RS-422/485 Port	Converter
SDA(–)	TD(–)
SDB(+)	TD(+)
RDA(–)	RD(–)
RDB(+)	RD(+)
SG	SHIELD
FG	EARTH

There is no problem of connecting a 220-Ω terminator at either end if YOKOGAWA's PLCs or temperature controllers are also connected to the communication line.

- **Four-wire system**

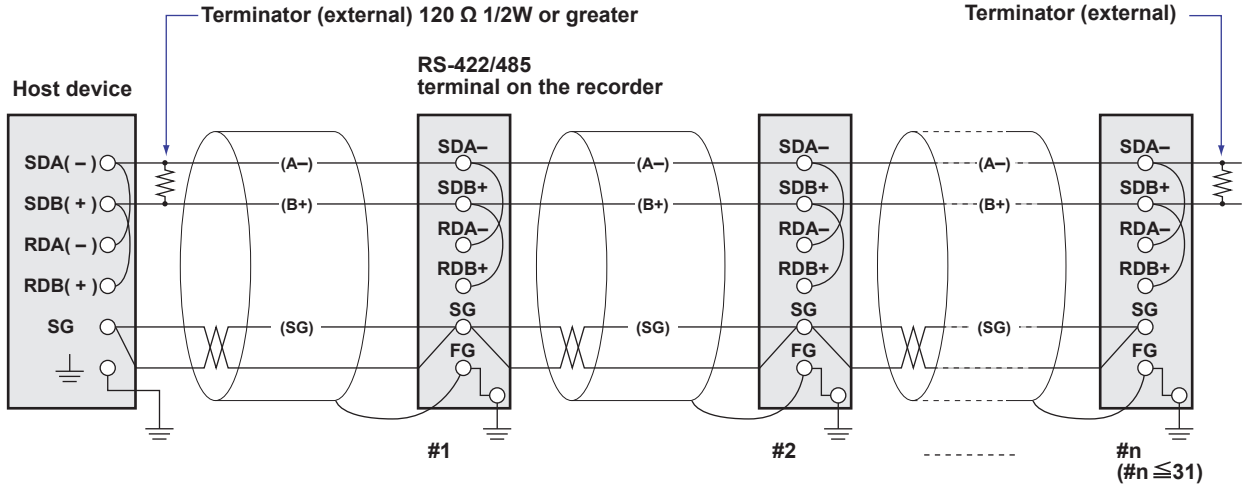
  Generally, a four-wire system is used to connect to a host device. In the case of a four-wire system, the transmission and reception lines need to be crossed over.



Do not connect terminators to #1 through #n-1.

- **Two-wire system**

  Connect the transmission and reception signals with the same polarity on the RS-422/485 terminal block. Only two wires are used to connect to the external device.



Do not connect terminators to #1 through #n-1.

Note

- The method used to eliminate noise varies depending on the situation. In the connection example, the shield of the cable is connected only to the recorder's ground (one-sided grounding). This is effective when there is a difference in the electric potential between the computer's ground and the recorder's ground. This may be the case for long distance communications. If there is no difference in the electric potential between the computer's ground and the recorder's ground, the method of connecting the shield also to the computer's ground may be effective (two-sided grounding). In addition, in some cases, using two-sided grounding with a capacitor connected in series on one side is effective. Consider these possibilities to eliminate noise.
- When using the two-wire interface (Modbus protocol), the 485 driver must be set to high impedance within 3.5 characters after the last data byte is sent by the host computer.

Serial interface converter

The recommended converter is given below.
SYSMEX RA CO.,LTD./MODEL RC-770X, LINE EYE/SI-30FA, YOKOGAWA/ML2

Some converters not recommended by Yokogawa have FG and SG pins that are not isolated. In this case, do not follow the diagram on the previous page (do not connect anything to the FG and SG pins). Especially in the case of long distance communications, the potential difference that appears may damage the recorder or cause communication errors. For converters that do not have the SG pin, they can be used without using the signal ground. For details, see the manual that comes with the converter.

On some non-recommended converters, the signal polarity may be reversed (A/B or +/- indication). In this case, reverse the connection.

For a two-wire system, the host device must control the transmission driver of the converter in order to prevent collisions of transmit and received data. When using the recommended converter, the driver is controlled using the RS (RTS) signal on the RS-232.

When instruments that support only the RS-422 interface exist in the system

When using the four-wire system, up to 32 recorders can be connected to a single host device. However, this may not be true if instruments that support only the RS-422 interface exist in the system.

When YOKOGAWA's recorders that support only the RS-422 interface exist in the system

The maximum number of connection is 16. Some of YOKOGAWA's conventional recorders (HR2400 and µR, for example) only support the RS-422 driver. In this case, only up to 16 units can be connected.

Note

In the RS-422 standard, 10 is the maximum number of connections that are allowed on one port (for a four-wire system).

Terminator

When using a multidrop connection (including a point-to-point connection), connect a terminator to the recorder if the recorder is connected to the end of the chain. Do not connect a terminator to a recorder in the middle of the chain. In addition, turn ON the terminator on the host device (see the manual of the host device). If a converter is being used, turn ON its terminator. The recommended converter is a type that has a built-in terminator.
Select the appropriate terminator (120 Ω), indicated in the figure, according to the characteristic impedance of the line, the installation conditions of the instruments, and so on.

1.2.5 USB Connection Procedure (GM)

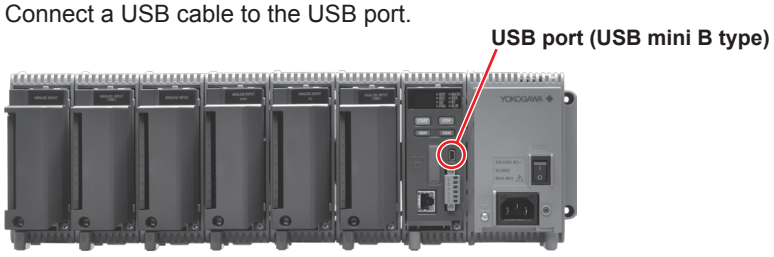
The procedure to connect a GM to the PC via USB is shown below. For instructions on how to use the PC, see the user's manual for your PC.

Configuring the GM

Turn the USB communication function on (default value is on). For the procedure, see section 2.19, "Configuring the USB Communication Function," in the *Data Acquisition System GM User's Manual* (IM 04L55B01-01EN).

Connecting the GM to the PC

Connect a USB cable to the USB port.



If the PC is connected to a network environment, a USB driver will be automatically installed. If it does not, check the download link for the driver at our website below, and install the driver.

http://www.smartdacplus.com/en/support/software/index.html

When the USB driver installation is complete, a COM port will be assigned.

Connect using the following communication conditions.

- Baud rate: 115200
- Parity: None
- Data length: 8 bits
- Stop bits: 1 bit
- Handshake: Off:Off

1.2.6 Bluetooth Connection Procedure (GM, /C8 option)

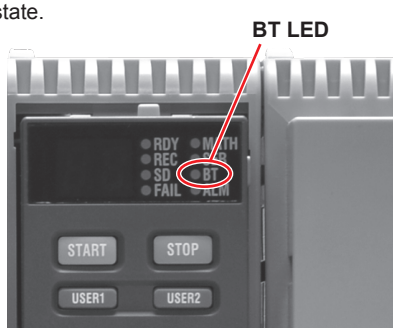
The procedure to connect a GM to the PC via Bluetooth is shown below. For instructions on how to use the PC, see the user's manual for your PC.

Configuring the GM

Turn the Bluetooth function on (default value is on). For the procedure, see section 2.20, "Configuring the Bluetooth Communication Function," in the *Data Acquisition System GM User's Manual* (IM 04L55B01-01EN).

Connecting the GM to the PC

1 Check whether the BT LED in the GM status display area is on. If the LED is off, hold down the GM USER1 key for at least 3 seconds.
The BT LED in the GM status display area is turns on, the GM enters the connection standby state.



2 Perform a pairing operation from the PC.

A 6-digit authentication code appears on the GM's 7 segment LED. Check that this authentication code matches that shown on the PC, and pair the devices. When pairing is complete, a COM port will be assigned.

Note

The GM stores up to eight entries of pairing information. This information is retained even when the power is turned off.
The pairing operation is not necessary in subsequent connections.

3 Perform the operation for connecting from the PC to the GM.
See "Appendix 7 Bluetooth Communication Connection Flow Chart" and section "2.2.7 How to Use Commands".

2.1 Command Transmission and Recorder Responses

2.1.1 General Communication

The recorder can work with various applications through the use of commands.
The communication that is achieved through commands is referred to as “general communication.”

2.1.2 Command Types and Functions

The following types of commands are available. The first character of command names represents the command type. For example, in the command “SRangeAI,” “S” represents the command type. The second and subsequent characters represent the contents of commands.

Type	Description
Operation commands Example: `OSetTime`	Commands that start with “O.” These commands are used to operate the recorder.
Setting commands Example: `SRangeAI`	Commands that start with “S.” These commands change the recorder settings.
Output commands Example: `FData`	Commands that start with “F.” These commands cause the recorder to output measured data and other types of data.
Communication Control commands Example: `CCheckSum`	Commands that start with “C.” These commands control the communication with the recorder.
Instrument information output commands Example: `_MFG`	Commands that start with an underscore. These commands cause the recorder to output its instrument information.

2.1.3 Command Syntax

A Single Command

A single command consists of a command name, parameters, delimiters, and terminator. The command name is written in the beginning, and parameters follow. Delimiters are used to separate the command name from parameters and between each parameter. A delimiter is a symbol that indicates a separation. A terminator is attached to the end of a command.

Command name,parameter 1,parameter 2 terminator

Delimiters

Example of a Command

```
SRangeAI,0001,VOLT,2V,OFF,-15000,18000,0
```

Commands in a Series (Setting commands only)

You can send multiple setting commands in a series. When writing a series of commands, separate each command with a sub delimiter. A sub delimiter is a symbol that indicates a separation. A terminator is attached to the end of the series. The maximum number of bytes that can be sent at once is 8000 bytes (8000 characters).

Command name,parameter 1,parameter 2;command name,parameter1 terminator

(Command 1) **(Command 2)**

Sub delimiter

Notes on Writing Commands in a Series

- Only setting commands can be written in a series.
- Queries (see the next section) cannot be written in a series.
- If there is an error in one of the commands in a series, the commands before it are canceled, and those after it are not executed.

Example of a Command

```
SRangeAI,0001,VOLT,2V,OFF,-15000,18000,0;SRangeAI,0002,SKIP
```

Queries

Queries are used to inquire the recorder settings. To send a query, append a question mark to the command name or parameter. When the recorder receives a query, it returns the relevant setting as a character string in an appropriate syntax. Queries can be used on some of the available setting and operation commands.

Command name? terminator

Command name,parameter1? terminator

Examples of Queries and Responses

Query	Example of Responses
SRangeAI?	SRangeAI,0001,VOLT,2V,OFF,–20000,20000,0 SRangeAI,0002,..... .....
SRangeAI,0001?	SRangeAI,0001,VOLT,2V,OFF,–20000,20000,0

Command Names

A command name is a character string consisting of up to 16 alphanumeric characters. The first character represents the command type.

Notes on Writing Commands Names

- Command names are not case sensitive.
- Spaces before the character string are ignored.

Parameters

Parameters are characteristic values that are attached to commands.

Notes on Writing Parameters

- Write parameters in their appropriate order.
- Spaces around and in the middle of parameters are ignored. Exception is the character strings that users specify.
- You can omit the setting command parameters that do not need to be changed from their current settings. If you omit parameters, write only the delimiters.
  Example: `SRangeAI,0001,,,,,1800,0` terminator
- If parameters are omitted and there are multiple delimiters at the end of the command, those delimiters can be omitted.
  Example: `SRangeAI,0001,VOLT,2V,,,,`terminator -> `SRangeAI,0001,VOLT,2V`terminator

There are two types of parameters: predefined expressions and user-defined character strings.

How to Write User-Defined Character Strings (Parameters)

- Enclose user-defined character strings in single quotation marks.
  Example The command for setting the channel 0001 tag to “SYSTEM1” is shown below.
  STagIO,0001,'SYSTEM1'
- There are two types of user-defined character strings depending on the type of characters that can be used.
  Character Strings Consisting Only of Characters in the ASCII Code Range (0x00 to 0x7f)
  In this manual, applicable parameters are indicated with “ASCII.”
  Example p3 Tag number (up to 16 characters, ASCII)

  You can use alphanumeric characters and some of the symbols. For the ASCII characters that you can use, see appendix 1.

  Character Strings Consisting of Characters in the UTF-8 Code Range
  In this manual, applicable parameters are indicated with “UTF-8.”
  Example p2 Tag (up to 32 characters, UTF-8)

  UTF-8 codes include ASCII codes. You can use UTF-8 characters, including the ASCII characters above. For the ASCII characters that you can use, see appendix 1.

Delimiters

Commas are used as delimiters.

Sub delimiters

Semicolons are used as sub delimiters.

Terminators

“CR+LF” is used as a terminator, meaning “CR” followed by “LF.” Expressed in ASCII code, it is 0x0d0x0a.

2.1.4 Recorder Responses

The recorder returns the following responses to commands.

- If the recorder successfully completes the processing of a received output request command, it outputs the requested data.
- If the recorder successfully completes the processing of a received command that is not an output request command, it outputs an affirmative response.
- If a command syntax error, setting error, or other error occurs, the recorder outputs a negative response.

For each command the recorder receives, it returns a single response. The controller (PC) side must process commands and responses in accordance with this command-response rule. If the command-response rule is not followed, the operation of the recorder is not guaranteed. For details on the response syntax, see **2.9 Responses to Commands**.

2.2 List of Commands

2.2.1 Setting Commands

Command	Description (Required Options) [Applicable Models]	Page
Measurement Operation Setting Commands		
SScan	Scan interval	2-11
SScanGroup	Scan group	2-11
SModeAI	AI module	2-11
SModeAICurrent	Current Input Type AI Module	2-12
SBOLmtAI	Upper and Lower Burnout Limits of AI Module	2-12
SBOLmtAICurrent	Upper and Lower Burnout Limits of Current Input Type AI Module	2-12
SModeDI	DI module	2-12
SScaleOver	Detection of values that exceed the scale	2-13
Recording Basic Setting Commands		**Page**
SMemory	Recording mode	2-13
SMemKeyConfirm	Record confirmation action [GX/GP]	2-13
SDispData	Display data recording	2-13
SEventData	Event data recording	2-14
Recording Channel Setting Commands		**Page**
SRecDisp	Channel for recording display data	2-14
SRecEvent	Channel for recording event data	2-14
SRecManual	Channel for recording manual sampled data	2-15
Batch Setting Commands		**Page**
SBatch	Batch function	2-15
STextField	Batch text	2-15
Data Save Setting Commands		**Page**
SDirectory	Name of directory to save data	2-16
SFileHead	File header	2-16
SFileName	File naming rule	2-16
SMediaSave	Automatic data file saving	2-16
SFileFormat	Display/event data file format	2-16
I/O Channel (AI/DI/DO) Setting Commands		**Page**
SRangeAI	Measurement range of AI channel	2-17
SRangeAICurrent	Measurement Range of Current Input Type AI Channel	2-18
SRangeDI	Measurement range of DI channel	2-19
SRangeDO	DO channel operation	2-19
SMoveAve	Moving average	2-20
SBurnOut	Behavior when a sensor burns out	2-20
SRjc	Reference junction compensation method	2-20
SAlarmIO	Alarm	2-21
SAlmHysIO	Alarm hysteresis	2-22
SAlmDlyIO	Alarm delay time	2-22
STagIO	Tag	2-22
SColorIO	Channel color	2-22
SZoneIO	Waveform display zone	2-22
SScaleIO	Scale display [GX/GP]	2-23
SBarIO	Bar graph display	2-23
SPartialIO	Partial expanded display [GX/GP]	2-23
SBandIO	Color scale band	2-23
SAlmMarkIO	Alarm mark	2-24
SValueIO	Upper/lower limit display characters	2-24
SCalibIO	Calibration correction	2-24
Math Channel Setting Commands		**Page**
SMathBasic	Math action (/MT)	2-25
SKConst	Constant (/MT)	2-25
SRangeMath	Computation expression (/MT)	2-25
STlogMath	TLOG (/MT)	2-26
SRolAveMath	Rolling average (/MT)	2-26
SAlarmMath	Alarm (/MT)	2-26
SAlmHysMath	Alarm hysteresis (/MT)	2-26
SAlmDlyMath	Alarm delay time (/MT)	2-27
STagMath	Tag (/MT)	2-27
SColorMath	Channel color (/MT)	2-27
SZoneMath	Waveform display zone (/MT)	2-27
SScaleMath	Scale display (/MT) [GX/GP]	2-27
SBarMath	Bar graph display (/MT)	2-27
SPartialMath	Partial expanded display (/MT) [GX/GP]	2-27
SBandMath	Color scale band (/MT)	2-28
SAlmMarkMath	Alarm mark (/MT)	2-28
Communication Channel Setting Commands		**Page**
SRangeCom	Measurement range (/MC)	2-29
SValueCom	Preset operation (/MC)	2-29
SWDCom	Watchdog timer (/MC)	2-29
SAlarmCom	Alarm (/MC)	2-29
SAlmHysCom	Alarm hysteresis (/MC)	2-30
SAlmDlyCom	Alarm delay time (/MC)	2-30
STagCom	Tag (/MC)	2-30
SColorCom	Channel color (/MC)	2-30
SZoneCom	Waveform display zone (/MC)	2-30
SScaleCom	Scale display (/MC) [GX/GP]	2-30
SBarCom	Bar graph display (/MC)	2-30
SPartialCom	Partial expanded display (/MC) [GX/GP]	2-31
SBandCom	Color scale band (/MC)	2-31
SAlmMarkCom	Alarm mark (/MC)	2-31
Alarm Setting Commands		**Page**
SAlmLimit	Rate-of-change alarm interval	2-32
SIndivAlmACK	Individual alarm ACK	2-32
SAlmSts	Alarm display hold/nonhold	2-32
Time Setting Commands		**Page**
STimer	Timer	2-32
SMatchTimer	Match time timer	2-32

Event Action Setting Commands		Page
SEventAct	Event action	2-33
Report Setting Commands		**Page**
SReport	Report type (/MT)	2-34
SRepData	Report data (/MT)	2-34
SRepTemp	Report output (/MT)	2-35
SDigitalSign	Electronic Signature Inclusion (/MT)	2-35
SRepCh	Report channel (/MT)	2-35
Display Setting Commands		**Page**
SLcd	LCD [GX/GP]	2-36
SViewAngle	View angle [GX/GP]	2-36
SBackColor	Screen background color [GX/GP]	2-36
SGrpChange	Automatic group switching time [GX/GP]	2-36
SAutoJump	Jump default display operation [GX/GP]	2-36
SCalFormat	Calendar display format [GX/GP]	2-36
SBarDirect	Bar graph display direction [GX/GP]	2-36
SChgMonitor	Value modification from the monitor	2-36
STrdWave	Trend waveform display [GX/GP]	2-37
STrdScale	Scale [GX/GP]	2-37
STrdLine	Trend line width, grid [GX/GP]	2-37
STrdRate	Trend interval switching [GX/GP]	2-37
STrdKind	Trend type [GX/GP]	2-37
STrdPartial	Partial expanded trend display [GX/GP]	2-37
SMsgBasic	Message writing	2-38
SGroup	Display group	2-38
STripLine	Display group trip line	2-38
SSclBmp	Scale bitmap image usage [GX/GP]	2-38
SMessage	Message	2-38
System Setting Commands		**Page**
STimeZone	Time zone	2-39
SDateBasic	Gradual time adjustment	2-39
SDateFormat	Date format	2-39
SDst	Daylight saving time	2-39
SLang	Language	2-39
STemp	Temperature unit	2-40
SDPoint	Decimal point type	2-40
SFailAct	Fail relay operation (/FL) [GX/GP]	2-40
SFailSts	Instrument status to output (/FL) [GX/GP]	2-40
SPrinter	Printer	2-40
SLed	LED indicator operation [GX/GP]	2-40
SSound	Sound [GX/GP]	2-41
SInstruTag	Instruments tag	2-41
SConfCmt	Setting file comment	2-41
SUsbInput	USB input device [GX/GP]	2-41
SSetComment	Configuration changes comment (/AS)	2-41
Internal Switch Setting Commands		**Page**
SSwitch	Internal switch operation	2-41
Serial Communication Setting Commands		**Page**
SSerialBasic	Serial communication basics (/C2 or /C3)	2-42
SModMaster	Modbus master (/C2/MC or /C3/MC)	2-42
SModMCmd	Modbus master transmission command (/C2/MC or /C3/MC)	2-42
SSerialAutoLOut	Auto logout for serial communication (/C2 or /C3)	2-43
Ethernet Communication Setting Commands		**Page**
SIpAddress	IP address information	2-43
SClient	Client function	2-43
SClientEncrypt	Client Communication Encryption	2-43
SDns	DNS information	2-44
SDhcp	DHCP client	2-44
SFtpKind	File to transfer via FTP	2-44
SFtpTime	FTP transfer time shift	2-44
SFtpCnct	FTP client connection destination server	2-45
SSmtpLogin	SMTP user authentication	2-45
SSmtpCnct	SMTP client connection destination server	2-45
SMailHead	Mail header	2-45
SMailBasic	Common section of the mail body	2-45
SMail	Destination and behavior for each mail type	2-45
SMailAlarm	Alarm notification mail target channels	2-46
SMailTime	Scheduled transmission times	2-46
SSntpCnct	SNTP client	2-46
SModClient	Modbus client operation (/MC)	2-46
SModCList	Modbus client connection destination server (/MC)	2-47
SModCCmd	Modbus client transmission command (/MC)	2-47
SServer	Server function	2-47
SServerEncrypt	Server Communication Encryption	2-47
SKeepAlive	Keepalive	2-48
STimeOut	Communication timeout	2-48
SFtpFormat	FTP server directory output format	2-48
SModDelay	Modbus server delay response	2-48
SModLimit	Modbus server connection limit	2-48
SModList	IP address to allow connection to Modbus server	2-48
SWattList	WT Communication Connection Server (/E2)	2-48
SWattClient	WT Communication Operation (/E2)	2-48
SWattData	WT Data Allocation to Communication Channel (/E2)	2-48

SKdcCnct	KDC Connection Destination (/AS)	2-49
SAuthKey	Certification Key (/AS)	2-49
SDarwinCnvCh	Darwin Channel Conversion (Darwin compatible communication)	2-49
Security Setting Commands		**Page**
SSecurity	Security function	2-50
SKdc	Password Management (/AS)	2-50
SOpePass	Password to unlock operation [GX/GP]	2-50
SOpeLimit	Operation lock details [GX/GP]	2-50
SUser	User settings	2-50
SUserLimit	Authority of user	2-51
SSignIn	Sign In (/AS)	2-52
SSignInTitle	Sign in title (/AS)	2-52
SSignInLimit	Sign in property (/AS)	2-52
SBTPassword	Bluetooth password (/C8) [GM]	
Local Setting Commands		**Page**
SMonitor	Monitor screen display information [GX/GP]	2-53
SMultiPattern	Multi panel division [GX/GP]	2-53
SMultiKind	Multi panel [GX/GP]	2-53
SHomeMonitor	Standard display information [GX/GP]	2-54
SHomeKind	Standard display [GX/GP]	2-54
SFavoriteMonitor	Favorite screen display information [GX/GP]	2-54
SFavoriteKind	Favorite screen [GX/GP]	2-54
Bluetooth Communication Setting Commands		**Page**
SBluetooth	Bluetooth communication function (/C8) [GM]	2-55
SBTID	Bluetooth communication ID (/C8) [GM]	2-55
SBTTimeOut	Bluetooth communication timeout (/C8) [GM]	2-56
USB Setting Commands		**Page**
SUsbFunction	USB function [GM]	2-56
SUsbAutoLOut	USB auto logout [GM]	2-56

2.2.2 Output Commands

Command	Description (Required Options) [Applicable Models]	Page
FData	Outputs the most recent channel data	2-56
FRelay	Outputs the most recent relay and internal switch status	2-56
FFifoCur	Outputs channel FIFO data	2-56
FSnap	Takes a snapshot [GX/GP]	2-57
FUser	Outputs the user level	2-57
FAddr	Outputs the IP address	2-57
FStat	Outputs the GX/GP status	2-57
FLog	Outputs the log	2-57
FEventLog	Outputs a Detail Event Log (/AS)	2-58
FMedia	Outputs external storage medium and internal memory information	2-58
FCnf	Outputs setting data	2-58
FChInfo	Outputs decimal place and unit information	2-59
FSysConf	Queries the system configuration and reconfigures modules	2-59
FBTDevInfo	Bluetooth device information output (/C8) [GM]	2-59

2.2.3 Operation Commands

Command	Description (Required Options) [Applicable Models]	Page
OSetTime	Sets the time	2-60
ORec	Starts or stops recording	2-60
OAlarmAck	Clears alarm output (alarm acknowledgement)	2-60
OExecRec	Generates a manual trigger, executes manual sample, takes a snapshot, or causes a timeout	2-60
OExecSNTP	Queries the time using SNTP	2-60
OMessage	Writes a message	2-60
OPassword	Changes the password	2-61
OMath	Starts, stops, or resets computation or clears the computation dropout status display	2-61
OSaveConf	Saves setting data	2-61
OSaveConfAll	Saves setting data at once [GM]	2-61
OCommCh	Sets a communication channel to a value	2-62
OEMail	Starts or stops the e-mail transmission function	2-62
OMBRestore	Recovers Modbus manually	2-62
ORTReset	Resets a relative timer	2-62
OMTReset	Resets the match time timer	2-62
OCmdRelay	Outputs the DO channel and internal switch status	2-62
OBatName	Sets a batch name	2-62
OBatComment	Sets a batch comment	2-63
OBatText	Sets a batch text	2-63
ODispRate	Switches the trend interval [GX/GP]	2-63
OLoadConf	Loads setting data	2-63
OLoadConfAll	Loads setting data at once [GM]	2-63
OSeriApply	Applies serial communication settings	2-64
OIPApply	Applies the IP address	2-64
OInit	Clears measured data and initializes setting data	2-64
OUsbFApply	Applies USB communication settings [GM]	2-64
OBTApply	Applies Bluetooth communication settings (/C8) [GM]	2-64
OBTClearList	Clears the Bluetooth connection list (/C8) [GM]	2-64
OLoginAssist	Assists Login [GX/GP]	2-64
OSendValue	Assists Touch Panel Operation Input [GX/GP]	2-65
OUserLockACK	User Locked ACK (/AS)	2-65
OKeyLock	Key lock on/off [GM]	2-65
OErrorClear	Clears the error display [GM]	2-65

2.2.4 Communication Control Commands

Command	Description (Required Options) [Applicable Models]	Page
CCheckSum	Sets the checksum	2-66
CSFilter	Sets the status filter	2-66
CLogin	Log in via communication	2-66
CLogout	Log out via communication	2-66
CBTConnect	Starts Bluetooth communication (/C8) [GM]	2-66
ESC O	Opens an instrument : RS-422/485 command	2-67
ESC C	Closes an instrument : RS-422/485 command	2-67

2.2.5 Instrument Information Commands

Command	Description	Page
_MFG	Outputs the instrument manufacturer	2-68
_INF	Outputs the instrument's product name	2-68
_COD	Outputs the instrument's basic specifications	2-68
_VER	Outputs the instrument's firmware version information	2-68
_OPT	Outputs the instrument's option installation information	2-68
_TYP	Outputs the instrument's temperature unit, and daylight saving time installation information	2-68
_ERR	Outputs the instrument's error number information	2-68
_UNS	Outputs the instrument's unit configuration information	2-68
_UNR	Outputs the instrument's unit configuration information	2-68
_MDS	Outputs the instrument's module configuration information	2-68
_MDR	Outputs the instrument's module configuration information	2-68

2.2.6 Conditions for Executing Commands

A command can be executed only when the recorder can execute the setting change or operation that the command specifies. Commands are invalid in the following circumstances.

- The recorder is not in a condition to accept the operation.
  For example, if the recorder is not recording, you cannot write a message.
- If the recorder does not have the function or is not using the function.
  The "Description" column in section 2.2.1, "Setting Commands" contains the recorder suffix codes that are required for using the commands.
- If the login function is in use, the command cannot be used at the user level that the user is logged in at.
- User restriction is placed on the operation.
  The following table lists the commands that are invalid according to the limitation types (p1 of the SOpeLimit command or p2 of the SUserLimit command).

Limitation Type	Invalid Command
Memory	ORec
Math	OMath
DataSave	OExecRec, OMTReset
Message	OMessage
Batch	OBatName, OBatComment, OBatText
AlarmACK	OAlarmAck
Comm	OEMail, OIPApply, OMBRestore
DispOpe	SHomeKind, SHomeMonitor, SFavoriteKind, SFavoriteMonitor, Smonitor, SMultiPattern, SMultiKind, ODispRate
DateSet	OExecSNTP, OSetTime
ChangeSet	Sxxxx*1, OLoadConf
File	OLoadConf, OSaveConf, Fmedia
System	OInit, FSysConf (when p1 is specified)
Out	OCmdRelay, OCommCh
CalibSet*2	SCalibIO

*1 Setting commands except for SHomeKind, SHomeMonitor, SFavoriteKind, SFavoriteMonitor, Smonitor, SMultiPattern, SMultiKind, and SCalibIO(Note)
(Note) Only when the advanced security function (/AS option) is in use on instruments whose version is 2.02 or later.
*2 Can be specified with the SUserLimit command when the advanced security function (/AS option) is in use on instruments whose version is 2.02 or later.

- The command is not applicable to the model.
  For commands that can be used only on certain models, the models are listed in the "Description" column in section 2.2.1, "Setting Commands," to section 2.2.4, "Communication Control Commands." (Examples: [GX/GP], [GM])
  The applicable models for the following commands are further reduced.

Command	Applicable Models
SViewAngle	GX10, GP10
SMultiPattern	GX20, GP20
SMultiKind	GX20, GP20

2.2.7 How to Use Commands

When Using Ethernet

- When not using the login function
  When you connect a PC to the recorder, the recorder will be ready to receive commands.
- When using the login function
  Establish communication with the recorder, and log in using a registered user account (CLogin command). After you finish the operation, log out (CLogout command).

When Using RS-232 (GX/GP)

- When you wire and connect a PC to the GX/GP, the GX/GP will be ready to receive commands.
- When using the login function, log in using a registered user account (CLogin command). After you finish the operation, log out (CLogout command).

When Using RS-422/485

- The device that is opened with an open command (ESC o) will be ready to receive commands.
- When using the login function, log in using a registered user account (CLogin command). After you finish the operation, log out (CLogout command).
- To close the connection, send the close command (ESC c).

When Using USB Communication (GM)

- When not using the login function
  When you connect a PC to the GM, the GM will be ready to receive commands.
- When using the login function
  Log in using a registered user account (CLogin command) to establish a connection. After you finish the operation, log out (CLogout command). You can also use the auto logout function (SUsbAutoLOut command).
- To remove a GM, perform a device removal procedure on the PC to disconnect, and then remove the cable.

When Using Bluetooth (GM, /C8 option)

- When not using the login function
  When the Bluetooth password function is enabled, use a command to start communication (CBTConnect) to send the password. When a connection is established, the GM will be ready to receive commands.
- When using the login function
  In addition to the procedure above, log in using a registered user account (CLogin command). After you finish the operation, log out (CLogout command). You can also use the auto logout function (SBTTimeOut command).
- To disconnect, perform a device removal procedure on the PC.

Note

- For the login operation, see appendix 2, “Login Procedure.”
- For details on Bluetooth connection, see appendix 7, “Bluetooth Communication Connection Flow Chart.”

2.2.8 Device Nomenclature in Command Descriptions

The following nomenclature is used in the command descriptions in section 2.4 to distinguish the devices.

Nomenclature	Device
Recorder	Both GX/GP and GM
Main unit	Both GX/GP and GM main units
GX/GP main unit	GX/GP main unit
GM main unit	GM main unit
Expandable I/O	GX/GP Expandable I/O
Sub unit	GM sub unit

2.3 Parameters

This section describes parameters.

2.3.1 Measuring Range Parameters

AI Channel Span

Specify the span using an integer.
Example If the range is -2.0000 V to 2.0000 V and you want to set the span lower limit to 0.5000 V and the span upper limit to 1.8000 V, set the parameters to 5000 and 18000, respectively.

```
SRangeAI,0001,VOLT,2V,FF,5000,18000,0
```

Scaling

Scaling is possible on AI and DI channels. Scaling is specified by a mantissa and decimal place.
Example To set the scaling to -10.00 to 20.00, set the scaling lower limit to -1000, scaling upper limit to 2000, and the decimal place to 2. The decimal place value represents the number of digits to the right of the decimal point.

Math Channel and Communication Channel Span

Set the span of math channels and communication channels using a mantissa and decimal place.
Example To set the span to 1.000 to 2.000, set the scaling lower limit to 1000, scaling upper limit to 2000, and the decimal place to 3.

2.3.2 Parameter Notation and Range

The table below shows the principle parameter notations and ranges of values.

Type	Notation and Range of Values	
[GX/GP] Unit number	No expandable I/O	0
	Expandable I/O installed	0 to 6
[GX/GP] Module number	When the unit is GX10/GP10	0 to 2
	When the unit is GX20/GP20	0 to 9
	When the unit is an expandable I/O	0 to 6
[GM] Unit number	No sub unit	0
	Sub unit installed	0 to 6
[GM] Module number	Main unit	0 to 9
	Sub unit	0 to 6
AI channel DI channel DO channel	Specify as “unit number+module number+channel.” Example The AI channel whose unit number is 0, module number is 1, and channel number is 02 is 0102.	
Math channel	GX20/GP20: 001 to 100 GX10/GP10: 001 to 050	
	GM10: 001 to 100	
	For SGroup and SMailAlarm commands, insert “A” in front. Example A001	

Type	Notation and Range of Values
Communication channel	GX10/GP10: 001 to 050 GX20-1/GP20-1: 001 to 300 GX20-2/GP20-2: 001 to 500
	GM10-1: 001 to 300 GM10-2: 001 to 500
	For SGroup and SMailAlarm commands, insert “C” in front. Example C001
Number of channels for recording display data	GX10/GP10: 001 to 100 GX20-1/GP20-1: 001 to 500 GX20-2/GP20-2: 001 to 1000
	GM10-1: 1 to 500 GM10-2: 1 to 1000
Number of channels for recording event data	GX10/GP10: 001 to 100 GX20-1/GP20-1: 001 to 500 GX20-2/GP20-2: 001 to 1000
	GM10-1: 1 to 500 GM10-2: 1 to 1000
Number of channels for recording manual sampled data	GX10/GP10/GX20-1/GP20-1: 1 to 50 GX20-2/GP20-2: 1 to 100
	GM10-1: 1 to 50 GM10-2: 1 to 100
Number of report channels	GX10/GP10: 1 to 50 GX20/GP20: 1 to 60
	GM10: 1 to 60
Number of display groups	GX10/GP10: 1 to 30 GX20-1/GP20-1: 1 to 50 GX20-2/GP20-2: 1 to 60
	GM10-1: 1 to 50 GM10-2: 1 to 60
Number of channels that can be registered to display groups	GX10/GP10: 10 GX20/GP20: 20
	GM10: 20
Modbus server setting number	GX10/GP10/GX20-1/GP20-1: 1 to 16 GX20-2/GP20-2: 1 to 32
	GM10-1: 1 to 16 GM10-2: 1 to 32
Modbus command number (Ethernet)	GX10/GP10: 1 to 50 GX20-1/GP20-1: 1 to 100 GX20-2/GP20-2: 1 to 200
	GM10-1: 1 to 100 GM10-2: 1 to 200
Modbus command number (serial communication)	GX10/GP10: 1 to 50 GX20/GP20: 1 to 100 GM10: 1 to 100
Server setting number for WT communication	GX10/GP10: 1 to 8 GX20/GP20: 1 to 16 GM10: 1 to 16
Communication channel allocation number for WT communication	GX10/GP10: 1 to 50 GX20/GP20: 1 to 300 GM10: 1 to 300

Type	Notation and Range of Values
Number of users that can be registered (user number)	GX10/GX20/GP10/GP20 Advanced security function (/AS) not installed or disabled: 1 to 50
	GX10/GX20/GP10/GP20 Advanced security function (/AS) enabled: 1 to 100
	GM: 1 to 50

2.3.3 Specifying a Range

When specifying consecutive channel numbers or group numbers in a setting command, you can specify them using a range instead of specifying each number one by one.

- Use a hyphen to separate the first number and the last number. For I/O channels, you can specify a range that spans over multiple slots that modules are installed in.
- You can specify the minimum number by omitting the number before the hyphen and the maximum number by omitting the number after the hyphen. If you want to specify all numbers from the first number to the last number, specify only the hyphen.

Example 1

To specify 3 to 10: "`3-10`"
To specify 3 to the maximum number: "`3-`"
To specify the first number to 10: "`-10`"
To specify all numbers: "`-`"

Example 2

A command that sets the channel ranges of AI modules installed in slots 0 to 2 to Skip.
`SRangeAI,0001-0210,Skip` or
`SRangeAI,-0210,Skip`
If a different module is installed in slot 1, queries will work, but setting commands will result in error.

2.4 Setting Commands

SScan

Scan Interval

Sets the scan interval.

Syntax `SScan,p1,p2`
`p1` Scan group (1)
`p2` Scan interval (100ms, 200ms, 500ms, 1s, 2s, 5s)
Query `SScan[,p1]?`
Example Set the scan interval to 1 second.
`SScan,1,1s`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If a low withstand voltage relay type analog input module is installed, scan interval less than or equal to 200 ms cannot be specified.
- If an electro-magnetic relay type analog input module is installed, scan interval less than or equal to 500 ms cannot be specified.

SScanGroup

Scan Group

Registers a measurement channel in scan group 1.

Syntax `SScanGroup,p1,p2,p3`
`p1` Unit number
`p2` Module number
`p3` Scan group (1)
`1` Scan group 1
Query `SScanGroup[,p1[,p2]]?`
Example Set the module installed in the main unit, whose module number is 2 in scan group 1.
`SScanGroup,0,2,1`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SModeAI

AI Module

Sets the mode and A/D integration time of an AI module (excluding current input type AI modules).

Syntax `SModeAI,p1,p2,p3,p4`
`p1` Unit number
`p2` Module number
`p3` Mode
`2CH` 2 channel mode
`10CH` 10 channel mode
`p4` AD integration time (Auto, 50Hz, 60Hz, Common)

Query `SModeAI[,p1[,p2]]?`
Example For the module installed in the main unit, whose module number is 2, set the mode to 10CH and the AD integration time to Auto.
`SModeAI,0,2,10CH,Auto`

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- Scan intervals shorter than 1 s cannot be specified if an electro-magnetic relay type (Type suffix code: -T1) analog input module is in use (set up).
- Fixed to 10 channel mode if an electro-magnetic relay type or low withstand voltage relay type analog input module is in use.
- You can set the parameters in the following combinations.

Scan Interval	Mode (p3)	Integration time (p4)			
		Auto	50Hz	60Hz	Common
100ms	2CH	Yes	Yes	Yes	No
	10CH	Yes	No	No	No
200ms	2CH	Yes	Yes	Yes	No
	10CH	Yes	No	No	No
500ms	—	Yes	Yes	Yes	No
1s	—	Yes	Yes	Yes	Yes*
2s	—	Yes	Yes	Yes	Yes
5s	—	Yes	Yes	Yes	Yes

* "No" if low withstand voltage relay type analog input module is in use.

SModeAICurrent

Current Input Type AI Module

Sets the mode and A/D integration time of an current input type AI module.

Syntax `SModeDICurrent,p1,p2,p3,p4`
- `p1` Unit number
- `p2` Module number
- `p3` Mode
  - `2CH` 2 channel mode
  - `10CH` 10 channel mode
- `p4` AD integration time (Auto, 50Hz, 60Hz, Common)

Query `SModeAICurrent[,p1[,p2]]?`
Example For the module installed in the main unit, whose module number is 2, set the mode to 10CH and the AD integration time to Auto.
`SModeAICurrent,0,2,10CH,Auto`

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- There are limitations on the allowable combinations of scan interval and p3 and p4. See the explanation for the SModeAI command.

SBOLmtAI

Upper and Lower Burnout Limits of AI Module

Sets the burnout limits for the general signal range of an AI module (excluding current input type AI modules).

Syntax `SBOLmtAI,p1,p2,p3,p4`
- `p1` Unit number
- `p2` Module number
- `p3` Lower burnout limit for the general signal range. Percentage of the specified span (–20.0 to –5.0)
- `p4` Upper burnout limit for the general signal range. Percentage of the specified span (105.0 to 120.0)

Query `SBOLmtAI[,p1[,p2]]?`
Example For the module installed in the main unit, whose module number is 2, set the lower burnout limit for the general signal range to -10% and the upper burnout limit for the general signal range to 110%.
`SBOLmtAI,0,2,-10.0,110.0`

SBOLmtAICurrent

Upper and Lower Burnout Limits of Current Input Type AI Module

Sets the burnout limits for the general signal range of a current input type AI module.

Syntax `SBOLmtAICurrent,p1,p2,p3,p4`
- `p1` Unit number
- `p2` Module number
- `p3` Lower burnout limit for the general signal range. Percentage of the specified span (–20.0 to –5.0)
- `p4` Upper burnout limit for the general signal range. Percentage of the specified span (105.0 to 120.0)

Query `SBOLmtAICurrent[,p1[,p2]]?`
Example For the module installed in the main unit, whose module number is 2, set the lower burnout limit for the general signal range to -10% and the upper burnout limit for the general signal range to 110%.
`SBOLmtAICurrent,0,2,-10.0,110.0`

SModeDI

DI Module

Sets the mode of a DI module.

Syntax
/MT `SModeDI,p1,p2,p3`
No /MT `SModeDI,p1,p2,p3,p4`
- `p1` Unit number
- `p2` Module number
- `p3` Mode (Normal, Remote)
  - `Normal` DI input
  - `Remote` Remote control input
- `p4` Filter for pulse input (On, Off)

Query `SModeDI[,p1[,p2]]?`
Example Set the module whose module number is 2 as a remote control input module.
`SModeDI,0,2,Remote`

Description
- You cannot use this command to configure settings while recording is in progress.

- You cannot use this command to configure settings while computation is in progress.
- Only one module can be set to remote. If different modules are set to remote numerous times, the last module will be the remote module.
- For modules installed in an expandable I/O or sub unit, p3 is fixed to Normal.
- Pulse input is valid on products with the math function (/MT option).

SScaleOver

Detection of Values That Exceed the Scale

Sets how to detect measurement over-range.

Syntax `SSclOver,p1`

`/P1` How to detect values that exceed the scale

- `FREE` Assume scale over-range when the measurement range is exceeded.
- `OVER` Assume scale over-range when ±105% of the scale is exceeded.

Query `SSclOver?`

Example Assume scale over-range when the measurement range is exceeded.

```
SSclOver,FREE
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- The setting specified with this command is valid if at least one module is installed.

SMemory

Recording Mode

Sets the type of data to record.

Syntax `SMemory,p1`

`p1` Recording mode

- `D` Display data
- `D+E1` Display data and event data
- `E1` Event data

Query `SMemory?`

Example Record display data.

```
SMemory,D
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- When the advanced security function (/AS) is enabled, p1=D+E1 cannot be specified.

SMemKeyConfirm

Record confirmation action [GX/GP]

Sets the record confirmation action.

Syntax `SMemKeyConfirm,p1`

`p1` Enable or disable confirmation screen (Off, On)

Query `SMemKeyConfirm?`

Example Show the confirmation screen.

```
SMemKeyConfirm,On
```

SDispData

Display Data Recording

Sets the display data recording mode.

Syntax `SDispData,p1,p2`

`p1` Recording interval (5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min, 1h, 2h, 4h, 10h)/div.

`p2` File save interval (10min, 20min, 30min, 1h, 2h, 3h, 4h, 6h, 8h, 12h,1day, 2day, 3day, 5day, 7day, 14day, 31day)

Query `SDispData?`

Example Set the recording interval to 1 minute and file save interval to 12 hours.

```
SDispData,1min,12h
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- You cannot choose a recording interval that is shorter than the scan interval.
- You cannot choose a recording interval that is not an integer multiple of the scan interval.
- File save interval is valid when display data recording is enabled (recording mode of the **SMemory** command).

SEventData

Event Data Recording

Sets the event data recording mode.

Syntax SEventData,p1,p2,p3,p4,p5,p6

- p1 Scan group (1)
- p2 Recording interval (100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 15s, 20s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min)
- p3 Operation mode
  - Free — Starts recording at recording start and stops recording at recording stop.
  - SingleTrigger — After a trigger event occurs, the recorder will record for the specified time and stop.
  - RepeatTrigger — After a trigger event occurs, the recorder will record for the specified time and stop. Then, the recorder will enter the trigger-wait state.
- p4 Data length (10min, 20min, 30min, 1h, 2h, 3h, 4h, 6h, 8h, 12h, 1day, 2day, 3day, 5day, 7day, 14day, 31day)
- p5 Pre-trigger (0, 5, 25, 50, 75, 95, 100) [%]
- p6 Trigger source key (Off, On)

Query SEventData[,p1]?

Example Record event data in Free mode at a recording interval of 1 second. Separate the data into different files every 2 hours.

```
SEventData,1,1s,Free,2h
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- You cannot choose a recording interval that is shorter than the scan interval.
- You cannot choose a recording interval that is not an integer multiple of the scan interval.
- This setting is valid when event data recording is enabled (recording mode of the **SMemory** command).
- When the advanced security function (/AS) is enabled, p3 is fixed to Free.

SRecDisp

Channel for Recording Display Data

Sets the channel for recording display data.

Syntax SRecDisp,p1,p2,p3

- p1 Number (see “Description”)
- p2 Channel type
  - Off — Do not record display data.
  - IO — I/O channel
  - Math — Math channel
  - Com — Communication channel
- p3 Channel number

Query SRecDisp[,p1]?

Example Assign the display data of I/O channel 0005 to number 10 and record.

```
SRecDisp,10,IO,0005
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Off, you cannot set p3.
- There is a limit to the number of recording channels depending on the recording interval (**SDispData** command).

Recording Interval	Number of Recording Channels
5 s/div	100
10 s/div	200
15 s/div or higher	500

For the large memory type (GX20-2/GP20-2/GM10-2), the following table applies.

Recording Interval	Number of Recording Channels	
	When recording only display data	When recording display data and event data
5s/div	200	100
10s/div	500	200
15s/div	1000	500
30s/div or more	1000	1000

- You cannot set a channel more than once.

SRecEvent

Channel for Recording Event Data

Sets the channel for recording event data.

Syntax SRecEvent,p1,p2,p3,p4

- p1 Scan group (1)
- p2 Number (see “Description”)
- p3 Channel type
  - Off — Do not record event data.
  - IO — I/O channel
  - Math — Math channel
  - Com — Communication channel
- p4 Channel number

Query SRecEvent[,p1[,p2]]?

Example Assign the event data of I/O channel 0006 to number 11 and record.

```
SEventData,1,11,IO,0006
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p3=Off, you cannot set p4.
- This setting is valid when event data recording is enabled (recording mode of the **SMemory** command).
- There is a limit to the number of recording channels depending on the recording interval (**SEventData** command).

Recording Interval	Number of Recording Channels
100 ms	100
200 ms	200
500 ms or more	500

For the large memory type (GX20-2/GP20-2/GM10-2), the following table applies.

Recording Interval	Number of Recording Channels	
	When recording only event data	When recording display data and event data
100ms	500	100
200ms	500	200
500ms	1000	500
1s or more	1000	1000

- You cannot set a channel more than once.

SRecManual

Channel for Recording Manual Sampled Data

Sets the channel for recording manual sampled data.

Syntax `SRecManual,p1,p2,p3`
- `p1` Number (1 to 50)
- `p2` Channel type
  - `Off` Do not record manual sampled data.
  - `IO` I/O channel
  - `Math` Math channel
  - `Com` Communication channel
- `p3` Channel number

Query `SRecManual[,p1]?`

Example Assign the manual sampled data of I/O channel 0003 to number 2 and record.

```
SRecManual,2,IO,0003
```

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Off, you cannot set p3.
- You cannot set a channel more than once.

SBatch

Batch Function

Configures the batch function's basic settings.

Syntax `SBatch,p1,p2,p3`
- `p1` Enable or disable (Off, On)
- `p2` Number of lot number digits (Off, 4, 6, 8)
  - `Off` Do not use lot numbers.
  - `4` 4-digit lot number
  - `6` 6-digit lot number
  - `8` 8-digit lot number
- `p3` Auto increment (Off, On)

Query `SBatch?`

Example Enable the batch function. Use 4-digit lot numbers. Automatically increment the lot number in the next operation.

```
SBatch,On,4,On
```

Description
- You cannot use this command to configure settings while recording is in progress.

STextField

Batch Text

Sets a batch text.

Syntax `STextField,p1,p2,p3`
- `p1` Field number (1 to 24)
- `p2` Title (up to 20 characters, UTF-8)
- `p3` Character string (up to 30 characters, UTF-8)

Query `STextField[,p1]?`

Example For field number 3, set the field title to "OPERATOR" and the character string to "RECORDER1."

```
STextField,3,'OPERATOR','RECORDER1'
```

Description
- You cannot use this command to configure settings while recording is in progress.

SDirectory

Name of Directory to Save Data

Sets the name of the directory to save data.

Syntax `SDirectory,p1`
- `p1` Directory name (up to 20 characters, ASCII)

Query `SDirectory?`

Example Set the directory name to “DATA0.”
```
SDirectory,'DATA0'
```

Description
- For the characters that you can use in the directory name (p1), see **Appendix 1**.
- The following character strings cannot be used for directory names.

Character String
AUX
CON
PRN
NUL
CLOCK
CLOCK$
COM0 to COM9
LPT0 to LPT9

- You cannot use a character string that starts or ends with a period or space for directory names.

SFileHead

File Header

Sets the file header character string.

Syntax `SFileHead,p1`
- `p1` File header (up to 50 characters, UTF-8)

Query `SFileHead?`

Example Set the file header to “GX_DATA.”
```
SFileHead,'GX_DATA'
```

SFileName

File Naming Rule

Sets the file naming rule for data files.

Syntax `SFileName,p1,p2`
- `p1` File naming rule
  - `Date` Date
  - `Serial` Serial number
  - `Batch` Batch name
- `p2` Specified file name (up to 16 characters, ASCII)

Query `SFileName?`

Example Set the file naming rule to “Date.” Set the specified file name to “Recorder1_data.”
```
SSFileName,Date,'Recorder1_data'
```

Description
- If the batch setting is disabled (SBatch: p1=Off), you cannot specify p1=Batch.
- If p1=Batch, p2 is invalid.
- For the characters that you can use in the specified file name (p2), see **Appendix 1**.

SMediaSave

Automatic Data File Saving

Sets the auto saving of data files to an external storage medium.

Syntax `SMediaSave,p1,p2`
- `p1` Auto saving to an external storage medium (Off, On)
- `p2` Media FIFO (Off, On)

Query `SMediaSave?`

Example Enable the auto saving to the external storage medium and media FIFO.
```
SMediaSave,On,On
```

SFileFormat

Display/Event Data File Format

Sets the file format of display data files and event data files.

Syntax `SFileFormat,p1`
- `p1` File format (Binary, Text)

Query `SFileFormat?`

Example Create files in text format.
```
SFileFormat,Text
```

Description
- The types of data that you can set file formats for are display data and event data.
- The file saving methods that the specified file format is applied to are auto saving, saving of unsaved data, manual saving, and FTP data transfer.
- When the advanced security function (/AS) is enabled, p1 is fixed to Binary.

SRangeAI

Measurement Range of AI Channel

Sets the measurement range of an AI channel.

Unused Channels

Syntax `SRangeAI,p1,p2`

`p1` Channel number
`p2` Input type (Skip)

Channels Whose Input Type Is DI and No Math

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6`

`p1` Channel number
`p2` Input type (DI)
`p3` Range (see “Description.”)
`P4` Calculation type (Off)
`p5` Span lower limit
`p6` Span upper limit

Channels Whose Input Type Is Volt, TC, or RTD and No Calculation

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7`

`p1` Channel number
`p2` Input type (Volt, TC, RTD)
`p3` Range (see “Description.”)
`P4` Calculation type (Off)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999)

Delta Channels

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8`

`p1` Channel number
`p2` Input type (Volt, TC, RTD, DI)
`p3` Range (see “Description.”)
`P4` Calculation type (Delta)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999) (can be set when p2 is not set to DI)
`p8` Reference channel number

Scaling Channels

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11`

`p1` Channel number
`p2` Input type (Volt, TC, RTD, DI)
`p3` Range (see “Description.”)
`P4` Calculation type (Scale)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999) (can be set when p2 is not set to DI)
`p8` Decimal Place (0 to 5)
`p9` Scaling lower limit
`p10` Scaling upper limit
`p11` Unit (up to 6 characters, UTF-8)

Unified Signal Input Channels (Input Type Is GS)

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13`

`p1` Channel number
`p2` Input type (GS)
`p3` Range (see “Description.”)
`P4` Calculation type (Scale)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999)
`p8` Decimal Place (0 to 5)
`p9` Scaling lower limit
`p10` Scaling upper limit
`p11` Unit (up to 6 characters, UTF-8)
`p12` Low-cut function (Off, On)
`p13` Low-cut point (0 to 50)

Square Root Channels

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14`

`p1` Channel number
`p2` Input type (Volt, GS)
`p3` Range (see “Description.”)
`P4` Calculation type (Sqrt)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999)
`p8` Decimal Place (0 to 5)
`p9` Scaling lower limit
`p10` Scaling upper limit
`p11` Unit (up to 6 characters, UTF-8)
`p12` Low-cut function (Off, On)
`p13` Low-cut point (0 to 50)
`p14` Low-cut output (Zero, Linear)

Log Scale (/LG) Channels

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11`

`p1` Channel number
`p2` Input type (Volt)
`p3` Range (see “Description.”)
`P4` Calculation type (LogT1, LogT2, LogT3)
  `LogT1` Log input
  `LogT2` Pseudo Log Input
  `LogT3` Linear-log input
`p5` Span lower limit (see “Description.”)
`p6` Span upper limit (see “Description.”)
`p7` Bias (–999999 to 999999)
`p8` Decimal place of mantissa (1, 2)
`p9` Scaling lower limit (exponential notation, 1.00E-15 to 1.00E15) (see “Description.”)
`p10` Scaling upper limit (exponential notation, 1.00E-15 to 1.00E15) (see “Description.”)
`p11` Unit (up to 6 characters, UTF-8)

Query `SRangeAI[,p1]?`

Example Measure -0.5000 to 1.0000 V on channel 0002. No scaling. No bias.
`SRangeAI,0002,Volt,2V,Off,-5000,10000,0`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=TC/RTD/DI, you cannot specify p4=Sqrt.
- If p2=GS, you cannot specify p4=Off/Delta.
- If p2=DI, you cannot set p7.
- If an electro-magnetic relay type or low withstand voltage relay type analog input module is in use, you cannot specify p2=RTD.
- The settable items for p3 are shown below.

p2=Volt	p2=TC	p2=RTD	p2=GS	p2=DI
20mV	R	Pt100	1-5V	Level
60mV	S	Pt100-H	0.4-2V	DI
200mV	B	JPt100		
1V	K	JPt100-H		
2V	K-H	Cu10GE		
6V	E	Cu10LN		
20V	J	Cu10WEED		
50V	T	Cu10BAILEY		
	N	Cu10a392		
	W	Cu10a393		
	L	Cu25		
	U	Cu53		
	PLATINEL	Cu100		
	PR20-40	J263B		
	WRe3-25	Ni100SAMA		
	KpvsAu7Fe	Ni100DIN		
	NiNiMo	Ni120		
	WWRe26	Pt25		
	N14	Pt50		
	XK	Pt200WEED		
		Cu10G		
		Cu50G		
		Cu100G		
		Pt46G		
		Pt100G		

- If p4=LogT1 on a Log scale channel, set the value in the following range.
  - p5<p6
  - p9, p10
    p9<p10. The maximum span is 15 decades.
    If the mantissa of p9 is 1.00, the minimum span is 1 decade.
    If the mantissa of p9 is not 1.00, the minimum span is 2 decades.
- If p4=LogT2 or LogT3 on a Log scale channel, set the value in the following range.
  - p5<p6
  - p9, p10
    The maximum span is 15 decades; the minimum is 1 decade.
    If the mantissa of p9 is not 1.00, the exponent is +14 or less, and the maximum span is 14 decades.

SRangeAICurrent

Measurement Range of Current Input Type AI Channel

Sets the measurement range of an current input type AI channel.

Unused Channels

Syntax `SRangeAICurrent,p1,p2`

`p1` Channel number
`p2` Input type (Skip)

Channels Whose Input Type is Current and No Math

Syntax `SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7`

`p1` Channel number
`p2` Input type (Current)
`p3` Range (0-20mA)
`p4` Math type (Off)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999)

Delta Channels

Syntax `SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7,p8`

`p1` Channel number
`p2` Input type (Current)
`p3` Range (0-20mA)
`P4` Math type (Delta)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999)
`p8` Reference channel number

Scaling Channels

Syntax `SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11`

`p1` Channel number
`p2` Input type (Current)
`p3` Range (0-20mA)
`P4` Math type (Scale)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999)
`p8` Decimal place (0 to 5)
`p9` Scaling lower limit
`p10` Scaling upper limit
`p11` Unit (up to 6 characters, UTF-8)

Scaling Channels (General Signal 4-20 mA Input)

Syntax `SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13`

`p1` Channel number
`p2` Input type (GS)
`p3` Range (4-20mA)
`P4` Math type (Scale)
`p5` Span lower limit
`p6` Span upper limit
`p7` Bias (–999999 to 999999)
`p8` Decimal place (0 to 5)
`p9` Scaling lower limit
`p10` Scaling upper limit
`p11` Unit (up to 6 characters, UTF-8)
`p12` Low-cut function (Off, On)
`p13` Low-cut point (0 to 50)

Square Root Channels

Syntax `SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14`

p1 Channel number
p2 Input type (Current, GS)
p3 Range
0-20mA When p2 = Current
4-20mA When p2 = GS
P4 Math type (Sqrt)
p5 Span lower limit
p6 Span upper limit
p7 Bias (–999999 to 999999)
p8 Decimal place (0 to 5)
p9 Scaling lower limit
p10 Scaling upper limit
p11 Unit (up to 6 characters, UTF-8)
p12 Low-cut function (Off, On)
p13 Low-cut point (0 to 50)
p14 Low-cut output (Zero, Linear)

Query `SRangeAICurrent[,p1]?`

Example Measure 0.000 to 10.000 mA on channel 0002. No scaling. No bias.
`SRangeAICurrent,0002,Current,0-20mA,Off,0,10000,0`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=GS, you cannot specify p4=Off/Delta.
- Specify p5 and p6 within the range shown in the following table.

Range (p3)	Value (p5, p6)
0-20mA	0.000 to 20.000
4-20mA	3.200 to 20.800

SRangeDI

Measurement Range of DI Channel

Sets the measurement range of a DI channel.

Unused Channels

Syntax `SRangeDI,p1,p2`
p1 Channel number
p2 Input type (Skip)

Channels That Are Not Delta, Scaling, Pulse Input

Syntax `SRangeDI,p1,p2,p3,p4,p5,p6`
p1 Channel number
p2 Input type (DI)
p3 Fixed at "-."
P4 Calculation type (Off)
p5 Span lower limit (0 to 1)
p6 Span upper limit (0 to 1)

Delta Channels

Syntax `SRangeDI,p1,p2,p3,p4,p5,p6,p7`
p1 Channel number
p2 Input type (DI)
p3 Fixed at "-."
P4 Calculation type (Delta)
p5 Span lower limit (0 to 1)
p6 Span upper limit (0 to 1)
p7 Reference channel number

Scaling Channels

Syntax `SRangeDI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10`
p1 Channel number
p2 Input type (DI)
p3 Fixed at "-."
P4 Calculation type (Scale)
p5 Span lower limit (0 to 1)
p6 Span upper limit (0 to 1)
p7 Decimal Place (0 to 5)
p8 Scaling lower limit
p9 Scaling upper limit
p10 Unit (up to 6 characters, UTF-8)

Pulse Input Channels

Syntax `SRangeDI,p1,p2,p3,p4,p5,p6`
p1 Channel number
p2 Input type (Pulse)
p3 Fixed at "-."
P4 Math type (Off)
p5 Span lower limit (0 to 999999)
p6 Span upper limit (0 to 999999)

Query `SRangeDI[,p1]?`

Example Measure 0 to 1 on channel 0103. No scaling.
`SRangeDI,0103,DI,-,Off,0,1`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- p2=Pulse can be specified when the math function (/MT) is installed.
- If p2=Pulse, p4=Delta or Scale cannot be specified.
- p2=Pulse cannot be specified when the operation mode of the DI module is set to Remote.

SRangeDO

DO Channel Operation

Sets the DO channel operation.

Alarm Output

Syntax `SRangeDO,p1,p2,p3,p4,p5,p6,p7,p8,p9`
p1 Channel number
p2 Output type (Alarm)
p3 Span lower limit (0 to 1)
P4 Span upper limit (0 to 1)
p5 Unit (up to 6 characters, UTF-8)
p6 Energize or de-energize
`Energize` Energize the relay (DO channel) during output.
`De_energize` De-energize the relay (DO channel) during output.
p7 Operation

And Operate when all set alarms are in the alarm state.
Or Operate when any of the set alarms are in the alarm state.

p8 Hold or nonhold
Hold Hold output until an alarm ACK operation.
Nonhold Clear output when the alarm is cleared.

p9 Relay (DO channel) action on acknowledge (Normal, Reset)

Alarm Output (Reflash)

Syntax SRangeDO,p1,p2,p3,p4,p5,p6,p7,p8,p9
p1 Channel number
p2 Output type (Alarm)
p3 Span lower limit (0 to 1)
P4 Span upper limit (0 to 1)
p5 Unit (up to 6 characters, UTF-8)
p6 Energize or de-energize
Energize Energize the relay (DO channel) during output.
De_energize De-energize the relay (DO channel) during output.
p7 Action (Reflash)
p8 Reflash time (500ms, 1s, 2s)
p9 Relay (DO channel) action on acknowledge

Manual Output

Specifies the output value.

Syntax SRangeDO,p1,p2,p3,p4,p5,p6
p1 Channel number
p2 Output type (Manual)
p3 Span lower limit (0 to 1)
P4 Span upper limit (0 to 1)
p5 Unit (up to 6 characters, UTF-8)
p6 Energize or de-energize
Energize Energize the relay (DO channel) during output.
De_energize De-energize the relay (DO channel) during output.

Fail Output (GM10 only)

Syntax SRangeDO,p1,p2,p3,p4,p5,p6
p1 Channel number
p2 Output type (Fail)
p3 Span lower limit (0 to 1)
p4 Span upper limit (0 to 1)
p5 Unit (up to 6 characters, UTF-8)
p6 Fixed to De_energize
De_energize De-energize the relay (DO channel) during output.

Query SRangeDO[,p1]?

Example Output an alarm on channel 0203. Set the span lower limit to 0 and span upper limit to 1. Specify energize operation, logic or operation, and hold operation. Set the action on ACK to Normal. Set the unit to “Unit.”

```
SRangeDO,0203,Alarm,0,1,Unit,Energize,Or,Hold,Normal
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Manual, you cannot set p7 or subsequent parameters.
- If p7=And or Or, you cannot set the reflash time.
- If individual alarm ACK is enabled (SIndivAlmACK command), p9 is fixed to Reset.

SMoveAve

Moving Average

Sets the moving average of an AI channel.

Syntax SMoveAve,p1,p2,p3
p1 Channel number
p2 Enable or disable (Off, On)
p3 Number of samples (2 to 100)

Query SMoveAve[,p1]?

Example Set the number of moving average samples for channel 0002 to 12.

```
SMoveAve,0002,On,12
```

SBurnOut

Behavior When a Sensor Burns Out

Sets the behavior for when a burnout occurs on an AI channel.

Syntax SBurnOut,p1,p2
p1 Channel number
p2 Burnout processing (Off, Up, Down)

Query SBurnOut[,p1]?

Example Set the measured result to positive overflow (Up) when a burnout is detected on channel 0001.

```
SBurnOut,0001,Up
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SRjc

Reference Junction Compensation Method

Sets the reference junction compensation method of an AI channel.

Syntax SRjc,p1,p2,p3
p1 Channel number
p2 Mode
Internal Use the internal compensation function.
External Use an external compensation device.

p3 Compensation temperature

-200 to 800	–20.0 to 80.0°C
-40 to 1760	–40 to 1760°F
2531 to 3532	253.1 to 353.2K

Query SRjc[,p1]?

Example Perform reference junction compensation of channel 0003 using the internal compensation circuit.

```
SRjc,0003,Internal
```

Perform reference junction compensation of channel 0004 using an external compensation device. Set the compensation temperature to -2.3°C.

```
SRjc,0004,External,-23
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Internal, p3 is invalid.

SAlarmIO

Alarm

Sets the alarm for AI and DI channels.

Do Not Set Alarms

Syntax SAlarmIO,p1,p2,p3

p1 Channel number

p2 Alarm number (1 to 4)

p3 Alarm on or off (Off)

Do Not Output Alarms

Syntax SAlarmIO,p1,p2,p3,p4,p5,p6,p7

p1 Channel number

p2 Alarm number (1 to 4)

p3 Alarm on or off (On)

P4 Alarm type (H, L, DH, DL, RH, RL, TH, TL)

For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), p4 is H, L, TH, or TL.

p5 Value

For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), specify p5 using exponential notation (e.g. 1.23E10, where the number of digits of the mantissa is as specified by p8 of the SRangeAI command).

p6 Detection (Off, On)

p7 Output (Off)

Output Alarms

Syntax SAlarmIO,p1,p2,p3,p4,p5,p6,p7,p8

p1 Channel number

p2 Alarm number (1 to 4)

p3 Alarm on or off (On)

P4 Alarm type (H, L, DH, DL, RH, RL, TH, TL)

For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), p4 is H, L, TH, or TL.

p5 Value

For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), specify p5 using exponential notation (e.g. 1.23E10, where the number of digits of the mantissa is as specified by p8 of the SRangeAI command).

p6 Detection (Off, On)

p7 Output

DO	Output to a relay (DO channel)
SW	Output to an internal switch

p8 Number

If p7=DO	Relay (DO channel) number
If p7=SW	Internal switch number (001 to 100)

Query SAlarmIO[,p1[,p2]]?

Example Set a high limit alarm (H) on alarm number 2 of channel 0001. Set the alarm value to 1.8000V. Use the alarm detection function. When an alarm occurs, output to the relay (DO channel) at number 0205.

```
SAlarmIO,0001,2,On,H,18000,On,DO,
0205
```

Description

- You cannot set this on a “Skip” channel.
- If p3=Off, you cannot set p4 or subsequent parameters.
- If p7=Off, you cannot set p8.
- For the alarm values of p5, use the values in the following table.

Channel Type	Input Type	Calculation Type	Alarm Type		
			H, L, TH, TL	RH, RL	DH, DL
AI channel	Volt, GS, TC, RTD	Off	(1)	(3)	
		Delta	(1)	(3)	(5)
		Scale	(2)	(4)	
		Sqrt	(2)	(4)	
		LogT1 LogT2 LogT3	(6)		
	DI	Off	0, 1	1	
		Delta	(1)	(3)	(5)
		Scale	(2)	(4)	
DI channel	DI	Same as the DI input of AI channels			
	Pulse	Off	0 - 999999	1 - 999999	Off

(1) Within the measurement range

(2) –5% to 105% of the scale but within –999999 to 999999 excluding the decimal point

(3) 1 digit to (measurement upper limit – measurement lower limit)

(4) 1 digit to (scale upper limit – scale lower limit) but within 1 to 999999 excluding the decimal point

(5) Within the difference measurement range

(6) Log scale range that corresponds to -5% to 105% of the span

- You cannot set DO channels or internal switches whose output type is set to Manual as output destination numbers.

SAlmHysIO

Alarm Hysteresis

Sets the alarm hysteresis for AI and DI channels.

Syntax `SAlmHysIO,p1,p2,p3`

`p1` Channel number

`p2` Alarm number (1 to 4)

`p3` Hysteresis

Alarm Type	Hysteresis Range
H, L, DH, DL	0.0% to 5.0% of the span or scale width However, this is fixed to 0 for DI channels.
Delta	0 to 5.0% of the measurement range
Linear scaling, Square root	0 to 100000
Log scale (/LG)	Fixed to 0.

Query `SAlmHysIO[,p1[,p2]]?`

Example Set a 0.5% hysteresis on alarm 3 of channel 0002.

```
SAlmHysIO,0002,3,5
```

Description

- Hysteresis specified for delay high and low limit alarms (TH and TL) and high and low limits on rate-of-change alarms (RH and RL) do not apply.
- When the input type of a DI channel is Pulse, hysteresis is fixed at 0.

SAlmDlyIO

Alarm Delay Time

Sets the alarm delay time for an AI or DI channel.

Syntax `SAlmDlyIO,p1,p2,p3,p4`

`p1` Channel number

`p2` Hour (0 to 24)

`p3` Minute (0 to 59)

`P4` Second (0 to 59)

Query `SAlmDlyIO[,p1]?`

Example Set the channel 0001 alarm delay time to 2 minutes 30 seconds.

```
SAlmDlyIO,0001,0,2,30
```

Description

- Set the delay time so that it is an integer multiple of the scan interval (**SScan** command).

STagIO

Tag

Sets a tag to an AI, DI, or DO channel.

Syntax `STagIO,p1,p2,p3`

`p1` Channel number

`p2` Tag (up to 32 characters, UTF-8)

`p3` Tag number (up to 16 characters, ASCII)

Query `STagIO[,p1]?`

Example Set the channel 0001 tag to “SYSTEM1” and the tag number to “TI002.”

```
STagIO,0001,'SYSTEM1','TI002'
```

SColorIO

Channel Color

Sets the color an AI, DI, or DO channel.

Syntax `SColorIO,p1,p2,p3,p4`

`p1` Channel number

`p2` R value of RGB display colors (0 to 255, see “Description.”)

`p3` G value of RGB display colors (0 to 255, see “Description.”)

`P4` B value of RGB display colors (0 to 255, see “Description.”)

Query `SColorIO[,p1]?`

Example Set the channel 0001 display color to red.

```
SColorIO,0001,255,0,0
```

Description

- The RGB values for different colors are indicated in the following table.

Color	R	G	B	Note
Red	255	0	0	
Green	0	153	51	
Blue	0	51	255	
Blue violet	119	51	204	GX10/GP10
	102	51	204	GX20/GP20 GM10
Brown	153	51	0	
Orange	255	153	51	
Yellow green	153	204	51	GX10/GP10
	170	221	51	GX20/GP20 GM10
Light blue	119	170	221	GX10/GP10
	153	204	255	GX20/GP20 GM10
Violet	204	102	204	GX10/GP10
	221	153	221	GX20/GP20 GM10
Gray	153	153	153	
Lime	102	255	0	
Cyan	0	255	255	
Dark blue	0	0	153	
Yellow	255	255	0	
Light gray	204	204	204	
Purple	153	0	153	GX10/GP10
	136	0	136	GX20/GP20 GM10
Black	0	0	0	
Pink	255	17	153	
Rosy brown	204	153	153	
Pale green	153	255	153	GX10/GP10
	187	255	153	GX20/GP20 GM10
Dark gray	102	102	102	
Olive	153	153	0	
Dark cyan	0	153	153	
Spring green	0	204	153	GX10/GP10
	0	221	119	GX20/GP20 GM10

SZoneIO

Waveform Display Zone

Sets the waveform display zone of an AI, DI, or DO

channel.

Syntax SZoneIO,p1,p2,p3
- p1 Channel number
- p2 Zone lower limit [%] (0 to 95)
- p3 Zone upper limit [%] (5 to 100)

Query SZoneIO[,p1]?

Example Set the waveform zone of channel 0001 waveform to 0% to 30%.
```
SZoneIO,0001,0,30
```

SScaleIO

Scale Display [GX/GP]

Sets the scale display of an AI, DI, or DO channel.

Syntax SScaleIO,p1,p2,p3
- p1 Channel number
- p2 Scale display position (Off, 1 to 10)
- p3 Number of scale divisions (4 to 12, C10)

Query SScaleIO[,p1]?

Example Display the channel 0001 scale at display position 1. Display four equally spaced main scale marks.
```
SScaleIO,0001,1,4
```

SBarIO

Bar Graph Display

Sets the bar graph display of an AI, DI, or DO channel.

Syntax SBarIO,p1,p2,p3
- p1 Channel number
- p2 Bar display base position
  - Lower Lower
  - Center Center
  - Upper Upper
- p3 Number of scale divisions (4 to 12)

Query SBarIO[,p1]?

Example Display the measured values of channel 0001 on a bar graph with the center set as the base position (Center). Display four equally spaced main scale marks.
```
SBarIO,0001,Center,4
```

SPartialIO

Partial Expanded Display [GX/GP]

Sets the partial expanded display of an AI channel waveform.

Syntax SPartialIO,p1,p2,p3,p4
- p1 Channel number
- p2 Partial expanded On/Off (On, Off)
- p3 Partial expanded boundary position [%] (1 to 99)
- P4 Partial expanded boundary value (span lower limit + 1 digit to span upper limit - 1 digit)

Query SPartialIO[,p1]?

Example For channel 0001 whose measurement range is 0 to 1.0000 V, display the measured value of 0.7500 V at the 50% position.
```
SPartialIO,0001,On,50,7500
```

Description
- You cannot set this on a “Skip” channel. p2 is fixed to Off.
- You cannot set this on a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3). p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- P2=On can be specified when the difference between the span upper and lower limits is 2 digits or greater.

SBandIO

Color Scale Band

Sets the color scale band of an AI channel.

Syntax SBandIO,p1,p2,p3,p4,p5,p6,p7
- p1 Channel number
- p2 Color scale band (Off, In, Out)
- p3 R value of the color scale band RGB colors (0 to 255)
- P4 G value of the color scale band RGB colors (0 to 255)
- p5 B value of the color scale band RGB colors (0 to 255)
- p6 Upper limit of the color scale band display (Span or scale lower limit to span or scale upper limit)
  For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), specify p6 using exponential notation (e.g. 1.23E10, where the number of digits of the mantissa is as specified by p8 of the SRangeAI command).
- p7 Lower limit of the color scale band display (Span or scale lower limit to span or scale upper limit)
  For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), specify p7 using exponential notation (e.g. 1.23E10, where the number of digits of the mantissa is as specified by p8 of the SRangeAI command).

Query SBandIO[,p1]?

Example For channel 0001, set a blue band in the range of -0.5000 to 1.0000.
```
SBandIO,0001,In,0,0,255,5000,10000
```

Description
- You cannot set this on a “Skip” channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- For details on RGB values, see “Description” of the **SColorIO** command.

SAlmMarkIO

Alarm Mark

Sets the display of the marker that indicates the specified alarm position of an AI or DI channel.

Syntax `SAlmMarkIO,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14,p15`

- `p1` Channel number
- `p2` Whether to display the alarm mark on the scale (Off, On)
- `p3` Alarm mark type
  - `Alarm` Display the default alarm mark
  - `Fixed` Display the mark with the specified color
- `P4` R value of the RGB mark colors for alarm 1 (0 to 255)
- `p5` G value of the RGB mark colors for alarm 1 (0 to 255)
- `p6` B value of the RGB mark colors for alarm 1 (0 to 255)
- `p7` R value of the RGB mark colors for alarm 2 (0 to 255)
- `p8` G value of the RGB mark colors for alarm 2 (0 to 255)
- `p9` B value of the RGB mark colors for alarm 2 (0 to 255)
- `p10` R value of the RGB mark colors for alarm 3 (0 to 255)
- `p11` G value of the RGB mark colors for alarm 3 (0 to 255)
- `p12` B value of the RGB mark colors for alarm 3 (0 to 255)
- `p13` R value of the RGB mark colors for alarm 4 (0 to 255)
- `p14` G value of the RGB mark colors for alarm 4 (0 to 255)
- `p15` B value of the RGB mark colors for alarm 4 (0 to 255)

Query `SAlmMarkIO[,p1]?`

Example Display the alarm marks for alarms 1 to 4 of channel 0001 in fixed colors red, brown, orange, and yellow, respectively.

```
SAlmMarkIO,0001,On,Fixed,255,0,0,
165,42,42,255,165,0,255,255,0
```

Description

- For details on RGB values, see “Description” of the **SColorIO** command.

SValueIO

Upper/Lower Limit Display Characters

Sets the upper/lower limit display characters of DI channel or DO channel.

Syntax `SValueIO,p1,p2,p3`

- `p1` Channel number
- `p2` Lower limit display string (up to 8 characters, UTF-8)
- `p3` Upper limit display string (up to 8 characters, UTF-8)

Query `SValueIO[,p1]?`

Example For channel 0001, set the lower limit to “OFF” and the upper limit to “ON.”

```
SValueIO,0001,'OFF','ON'
```

SCalibIO

Calibration Correction

Sets the calibration correction for AI channels.

Disable Calibration Correction

Syntax `SCalibIO,p1,p2`

- `p1` Channel number
- `p2` Linearizer mode (Off)

Use Calibration Correction

Syntax `SCalibIO,p1`

- `p1` Channel number
- `p2` Linearizer mode
  - `Appro` Linearizer approximation
  - `Bias` Linearizer bias
- `p3` Number of set points (2 to 12)
- `P4` Input value of set point 1
- `p5` Output value of set point 1
- `p6` Input value of set point 2
- `p7` Output value of set point 2
- `p8` Input value of set point 3
- `p9` Output value of set point 3
- `p10` Input value of set point 4
- `p11` Output value of set point 4
- `p12` Input value of set point 5
- `p13` Output value of set point 5
- `p14` Input value of set point 6
- `p15` Output value of set point 6
- `p16` Input value of set point 7
- `p17` Output value of set point 7
- `p18` Input value of set point 8
- `p19` Output value of set point 8
- `p20` Input value of set point 9
- `p21` Output value of set point 9
- `p22` Input value of set point 10
- `p23` Output value of set point 10
- `p24` Input value of set point 11
- `p25` Output value of set point 11
- `p26` Input value of set point 12
- `p27` Output value of set point 12

Query `SCalibIO[,p1]?`

Example Set three set points on channel 0001 (measurement range: 0 to 1.0000 V). Set the set points as follows: when the input value is 0 V, the output value is 0.0010 V; when the input value is 0.5000 V, the output value is 0.5020 V; when the input value is 1.0000 V, the output value is 0.9970 V.

```
SCalibIO,0001,Appro,3,0,10,5000,
5020,10000,9970
```

Description

- If p2=Off, you cannot set p3 or subsequent parameters.
- You cannot specify set points beyond the number of points specified by p3.
- If the AI channel input type (p2 of **SRangeAI**) is set to Skip or DI, you cannot specify anything other than p2=Off.

SMathBasic

Math Action (/MT)

Sets the basic operation of math channels.

Syntax

GX/GP `SMathBasic,p1,p2,p3,p4`

GM `SMathBasic,p1,p2,p3,p4,p5,p6`

`p1` Indication on computation error

`+Over`	Display the computed value as +Over.
`-Over`	Display the computed value as −Over.

`p2` SUM and AVE computation when overflow data is detected

`Error`	Sets the computation result to computation error.
`Skip`	Discards the data that overflowed and continues the computation.
`Limit`	Computes by substituting upper or lower limit values in the data that overflowed. • For channels that do not have linear scaling specified, the upper or lower limit of the measuring range • For channels that have linear scaling specified, the scaling upper or lower limit • For math channels, the specified span upper or lower limit.

`p3` MAX, MIN, and P-P computation when overflow data is detected

`Over`	Computes using data that overflowed.
`Skip`	Discards the data that overflowed and continues the computation.

`P4` START/STOP key action
(GX/GP: Off, Start/Stop, Reset+Start/Stop)
(GM: Off)

`Off`	Computation does not start even when recording starts.
`Start/Stop`	Computation starts when recording starts.
`Reset+Start/Stop`	Computation resets and starts when recording starts.

`P5` START key action (Off, Start, Reset+Start)

`Off`	Recording starts but not computation.
`Start`	Computation starts when recording starts.
`Reset+Start`	Computation resets and starts when recording starts.

`P6` STOP key action (Off, Stop)

`Off`	Recording stops but not computation.
`Stop`	Computation stops when recording stops.

Query `SMathBasic?`

Example Set the indication on computation error to "+Over," computation when overflow data is detected to "Skip," and start computation when recording starts.

```
SMathBasic,+Over,Skip,Skip,Start/Stop
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- p5 and p6 are invalid parameters for the GX/GP.

SKConst

Constant (/MT)

Sets a constant for use in computations.

Syntax `SKConst,p1,p2`

`p1` Constant number (1 to 100)

`p2` Value (–9.9999999E+29 to –1E–30, 0, 1E–30 to 9.9999999E+29, eight significant digits)

Query `SKConst[,p1]?`

Example Set constant number 12 to 1.0000E–10.

```
SKConst,12,1.0000E-10
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SRangeMath

Computation Expression (/MT)

Sets the computation expression of a math channel.

Unused Channels

Syntax `SRangeMath,p1,p2`

`p1` Channel number

`p2` Computation expression on/off (Off)

Used Channels

Syntax `SRangeMath,p1,p2,p3,p4,p5,p6,p7,p8`

`p1` Channel number
`p2` Computation expression on/off (On)
`p3` Math channel type (Normal)
`P4` Expression (up to 120 characters, ASCII)
`p5` Decimal Place (0 to 5)
`p6` Span lower limit (−9999999 to 99999999)
`p7` Span upper limit (−9999999 to 99999999)
`p8` Unit (up to 6 characters, UTF-8)

Query `SRangeMath[,p1]?`

Example Set expression 0001+0002 in math channel 015. Set the measurement range is 0.0 to 100.0%.
`SRangeMath,015,On,Normal,0001+0002,1,0,1000,'%'`

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- A blank character string cannot be used in expressions.
- You cannot set the span upper and lower limits to the same value.

STlogMath

TLOG (/MT)

Sets the TLOG of a math channel.

Syntax `STlogMath,p1,p2,p3,p4,p5`
- `p1` Channel number
- `p2` Timer Type
  - `Timer` Timer
  - `MatchTimeTimer` Match time timer
- `p3` Timer number (1 to 4)
- `P4` Sum scale (Off, /sec, /min, /hour)
- `p5` Reset (On, Off)

Query `STlogMath[,p1]?`

Example Assign timer 2 to math channel 015. Set the sum scale to Off and disable reset.
`STlogMath,015,Timer,2,Off,Off`

Description
- You cannot use this command to configure settings while computation is in progress.

SRolAveMath

Rolling Average (/MT)

Sets rolling average on a math channel.

Syntax `SRolAveMath,p1,p2,p3,p4`
- `p1` Channel number
- `p2` Enable or disable (Off, On)
- `p3` Sample interval (1 to 6s, 10s, 12s, 15s, 20s, 30s, 1 to 6min, 10min, 12min, 15min, 20min, 30min, 1h)
- `P4` Number of samples (1 to 1500)

Query `SRolAveMath[,p1]?`

Example On math channel 015, take the rolling average of 30 data values over 1 minute intervals and use the results as the computed values.
`SRolAveMath,015,On,1min,30`

SAlarmMath

Alarm (/MT)

Sets the alarm of a math channel.

Do Not Set Alarms

Syntax `SAlarmMath,p1,p2,p3`
- `p1` Channel number
- `p2` Alarm number (1 to 4)
- `p3` Alarm on or off (Off)

Do Not Output Alarms

Syntax `SAlarmMath,p1,p2,p3,p4,p5,p6,p7`
- `p1` Channel number
- `p2` Alarm number (1 to 4)
- `p3` Alarm on or off (On)
- `P4` Alarm type (H, L, TH, TL)
- `p5` Alarm value (within the span range)
- `p6` Detection (Off, On)
- `p7` Output (Off)

Output Alarms

Syntax `SAlarmMath,p1,p2,p3,p4,p5,p6,p7,p8`
- `p1` Channel number
- `p2` Alarm number (1 to 4)
- `p3` Alarm on or off (On)
- `P4` Alarm type (H, L, TH, TL)
- `p5` Alarm value (within the span range)
- `p6` Detection (Off, On)
- `p7` Output
  - DO: Output to a relay (DO channel)
  - SW: Output to an internal switch
- `p8` Number
  - If p7=DO: Relay (DO channel) number
  - If p7=SW: Internal switch number (001 to 100)

Query `SAlarmMath[,p1]?`

Example Set a high limit alarm (H) on alarm number 2 of math channel 015. Set the alarm value to 85.0. When an alarm occurs, output to the relay (DO channel) at number 0105.
`SAlarmMath,015,2,On,H,850,On,DO,0105`

Description
- You cannot set this on a “Off” channel.
- If p3=Off, you cannot set p4 or subsequent parameters.
- If p7=Off, you cannot set p8.
- You cannot set DO channels or internal switches whose output type is set to Manual as output destination numbers.

SAlmHysMath

Alarm Hysteresis (/MT)

Sets the alarm hysteresis for a math channel.

Syntax `SAlmHysMath,p1,p2,p3`
- `p1` Channel number
- `p2` Alarm number (1 to 4)
- `p3` Hysteresis

Alarm Type	Hysteresis Range
H, L	0 to 100000

Query `SAlmHysMath[,p1[,p2]]?`

Example Set a hysteresis on alarm 3 of math channel 015.

```
SAlmHysMath,015,3,10
```

Description
- Hysteresis specified for delay high and low limit alarms (TH and TL) does not apply.

SAlmDlyMath

Alarm Delay Time (/MT)

Sets the alarm delay time for a math channel.

Syntax `SAlmDlyMath,p1,p2,p3,p4`
- `p1` Channel number
- `p2` Hour (0 to 24)
- `p3` Minute (0 to 59)
- `P4` Second (0 to 59)

Query `SAlmDlyMath[,p1]?`

Example Set the math channel 015 alarm delay time to 2 minutes 30 seconds.
```
SAlmDlyMath,015,0,2,30
```

Description
- Set the delay time so that it is an integer multiple of the scan interval (**SScan** command).

STagMath

Tag (/MT)

Sets the tag of a math channel.

Syntax `STagMath,p1,p2,p3`
- `p1` Channel number
- `p2` Tag (up to 32 characters, UTF-8)
- `p3` Tag number (up to 16 characters, ASCII)

Query `STagMath[,p1]?`

Example Set the math channel 015 tag to “SYSTEM1” and the tag number to “TI002.”
```
STagMath,015,'SYSTEM1','TI002'
```

SColorMath

Channel Color (/MT)

Sets the color of a math channel.

Syntax `SColorMath,p1,p2,p3,p4`
- `p1` Channel number
- `p2` R value of RGB display colors (0 to 255)
- `p3` G value of RGB display colors (0 to 255)
- `P4` B value of RGB display colors (0 to 255)

Query `SColorMath[,p1]?`

Example Set the math channel 015 display color to red.
```
SColorMath,015,255,0,0
```

Description
- For details on RGB values, see “Description” of the **SColorIO** command.

SZoneMath

Waveform Display Zone (/MT)

Sets the waveform display zone of a math channel.

Syntax `SZoneMath,p1,p2,p3`
- `p1` Channel number
- `p2` Zone lower limit [%] (0 to 95)
- `p3` Zone upper limit [%] (5 to 100)

Query `SZoneMath[,p1]?`

Example Set the waveform zone of math channel 015 waveform to 0% to 30%.
```
SZoneMath,015,0,30
```

SScaleMath

Scale Display (/MT) [GX/GP]

Sets the scale display of a math channel.

Syntax `SScaleMath,p1,p2,p3`
- `p1` Channel number
- `p2` Scale display position (Off, 1 to 10)
- `p3` Number of scale divisions (4 to 12, C10)

Query `SScaleMath[,p1]?`

Example Display the math channel 015 scale at display position 1. Display four equally spaced main scale marks.
```
SScaleMath,015,1,4
```

SBarMath

Bar Graph Display (/MT)

Sets the bar graph display of a math channel.

Syntax `SBarMath,p1,p2,p3`
- `p1` Channel number
- `p2` Bar display base position
  - `Lower` Lower
  - `Center` Center
  - `Upper` Upper
- `p3` Number of scale divisions (4 to 12)

Query `SBarMath[,p1]?`

Example Display the computed values of math channel 015 on a bar graph with the center set as the base position (Center). Display four equally spaced main scale marks.
```
SBarMath,015,Center,4
```

SPartialMath

Partial Expanded Display (/MT) [GX/GP]

Sets the partial expanded display of a math channel waveform.

Syntax `SPartialMath,p1,p2,p3,p4`
- `p1` Channel number
- `p2` Partial expanded On/Off (On, Off)
- `p3` Partial expanded boundary position [%] (1 to 99)
- `P4` Partial expanded boundary value

Query `SPartialMath[,p1]?`

Example For channel 015 whose measurement range is 0 to 1.0000 V, display the measured value of 0.7500 V at the 50% position.
```
SPartialMath,015,On,50,7500
```

Description
- You cannot set this on a “Off” channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.

- P2=On can be specified when the difference between the span upper and lower limits is 2 digits or greater.

SBandMath

Color Scale Band (/MT)

Sets the color scale band of a math channel.

Syntax `SBandMath,p1,p2,p3,p4,p5,p6,p7`

- `p1` Channel number
- `p2` Color scale band (Off, In, Out)
- `p3` R value of the color scale band RGB colors (0 to 255)
- `P4` G value of the color scale band RGB colors (0 to 255)
- `p5` B value of the color scale band RGB colors (0 to 255)
- `p6` Upper limit of the color scale band display (span lower limit to span upper limit)
- `p7` Lower limit of the color scale band display (span lower limit to span upper limit)

Query `SBandMath[,p1]?`

Example For math channel 015, set a blue band in the range of -0.5000 to 1.0000.

```
SBandMath,015,In,0,0,255,5000,
10000
```

Description

- You cannot set this on a “Off” channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- For details on RGB values, see “Description” of the **SColorIO** command.

SAlmMarkMath

Alarm Mark (/MT)

Sets the display of the marker that indicates the specified alarm position of a math channel.

Syntax `SAlmMarkMath,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14,p15`

- `p1` Channel number
- `p2` Whether to display the alarm mark on the scale (Off, On)
- `p3` Alarm mark type
  - `Alarm` Display the default alarm mark
  - `Fixed` Display the mark with the specified color
- `P4` R value of the RGB mark colors for alarm 1 (0 to 255)
- `p5` G value of the RGB mark colors for alarm 1 (0 to 255)
- `p6` B value of the RGB mark colors for alarm 1 (0 to 255)
- `p7` R value of the RGB mark colors for alarm 2 (0 to 255)
- `p8` G value of the RGB mark colors for alarm 2 (0 to 255)
- `p9` B value of the RGB mark colors for alarm 2 (0 to 255)
- `p10` R value of the RGB mark colors for alarm 3 (0 to 255)
- `p11` G value of the RGB mark colors for alarm 3 (0 to 255)
- `p12` B value of the RGB mark colors for alarm 3 (0 to 255)
- `p13` R value of the RGB mark colors for alarm 4 (0 to 255)
- `p14` G value of the RGB mark colors for alarm 4 (0 to 255)
- `p15` B value of the RGB mark colors for alarm 4 (0 to 255)

Query `SAlmMarkMath[,p1]?`

Example Display the alarm marks for alarms 1 to 4 of math channel 015 in fixed colors red, brown, orange, and yellow, respectively.

```
SAlmMarkMath,015,On,Fixed,255,0,0,
165,42,42,255,165,0,255,255,0
```

Description

- For details on RGB values, see “Description” of the **SColorIO** command.

SRangeCom

Measurement Range (/MC)

Sets the measurement range of a communication channel.

Unused Channels

Syntax SRangeCom,p1,p2

- p1 Channel number
- p2 Enable or disable (Off)

Used Channels

Syntax SRangeCom,p1,p2,p3,p4,p5,p6

- p1 Channel number
- p2 Enable or disable (On)
- p3 Decimal Place (0 to 5)
- P4 Span lower limit (-9999999 to 99999999)
- p5 Span upper limit (-9999999 to 99999999)
- p6 Unit (up to 6 characters, UTF-8)

Query SRangeCom[,p1]?

Example Measure 0.00 to 100.00% on communication channel 025.

```
SRangeCom,025,On,2,0,10000,'%'
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Off, you cannot set p3 or subsequent parameters.
- You cannot set the span upper and lower limits to the same value.

SValueCom

Preset Operation (/MC)

Sets the preset operation of a communication channel.

Syntax SValueCom,p1,p2,p3

- p1 Channel number
- p2 Value at power-on (Preset, Last)
- p3 Preset value (–9.999999E+29 to –1E–30, 0, 1E–30 to 9.999999E+29)

Query SValueCom[,p1]?

Example At power-on, replace the communication channel 025 value with the preset value of 0.5.

```
SValueCom,025,Preset,0.5
```

SWDCom

Watchdog Timer (/MC)

Sets the watchdog timer of a communication channel.

Channels That Do Not Use Watchdog Timers

Syntax SWDCom,p1,p2

- p1 Channel number
- p2 Watchdog timer usage (Off)

Channels That Use Watchdog Timers

Syntax SWDCom,p1,p2,p3,p4

- p1 Channel number
- p2 Watchdog timer usage (On)
- p3 Watchdog timer (1 to 120) [s]
- p4 Value at timer expired (Preset, Last)

Query SWDCom[,p1]?

Example Set the watchdog timer of communication channel 025 to 60 seconds. Replace the communication channel 025 value with its preset value at watchdog timer expiration.

```
SWDCom,025,On,60,Preset
```

Description

- If p2=Off, you cannot set p3 or subsequent parameters.

SAlarmCom

Alarm (/MC)

Sets the alarm of a communication channel.

No Alarm Setting

Syntax SAlarmCom,p1,p2,p3

- p1 Channel number
- p2 Alarm number (1 to 4)
- p3 Alarm on or off (Off)

Do Not Output Alarms

Syntax SAlarmCom,p1,p2,p3,p4,p5,p6,p7

- p1 Channel number
- p2 Alarm number (1 to 4)
- p3 Alarm on or off (On)
- P4 Alarm type (H, L, TH, TL)
- p5 Alarm value (within the span range)
- p6 Detection (Off, On)
- p7 Output (Off)

Output Alarms

Syntax SAlarmCom,p1,p2,p3,p4,p5,p6,p7,p8

- p1 Channel number
- p2 Alarm number (1 to 4)
- p3 Alarm on or off (On)
- P4 Alarm type (H, L, TH, TL)
- p5 Alarm value (within the span range)
- p6 Detection (Off, On)
- p7 Output (Off)
  - DO Output to a relay (DO channel)
  - SW Output to an internal switch
- p8 Number
  - If p7=DO Relay (DO channel) number
  - If p7=SW Internal switch number (001 to 100)

Query SAlarmCom[,p1]?

Example Set a high limit alarm (H) on alarm number 2 of communication channel 025. Set the alarm value to 85.0%. When an alarm occurs, output to the relay (DO channel) at number 0105.

```
SAlarmCom,025,2,On,H,850,On,
DO,0105
```

Description

- You cannot set this on a “Off” communication channel.

- If p3=Off, you cannot set p4 or subsequent parameters.
- If p7=Off, you cannot set p8.
- You cannot set DO channels or internal switches whose output type is set to Manual as output destination numbers.

SAlmHysCom

Alarm Hysteresis (/MC)

Sets the alarm hysteresis for a communication channel.

Syntax `SAlmHysCom,p1,p2,p3`
`p1` Channel number
`p2` Alarm number (1 to 4)
`p3` Hysteresis

Alarm Type	Hysteresis Range
H, L	0 to 100000

Query `SAlmHysCom[,p1]?`
Example Set a hysteresis on alarm 3 of communication channel 025.
`SAlmHysCom,025,3,10`

Description
- Hysteresis specified for delay high and low limit alarms (TH and TL) does not apply.

SAlmDlyCom

Alarm Delay Time (/MC)

Sets the alarm delay time for a communication channel.

Syntax `SAlmDlyCom,p1,p2,p3,p4`
`p1` Channel number
`p2` Hour (0 to 24)
`p3` Minute (0 to 59)
`P4` Second (0 to 59)
Query `SAlmDlyCom[,p1]?`
Example Set the communication channel 025 alarm delay time to 2 minutes 30 seconds.
`SAlmDlyCom,025,0,2,30`

Description
- Set the delay time so that it is an integer multiple of the scan interval (**SScan** command).

STagCom

Tag (/MC)

Sets the tag of a communication channel.

Syntax `STagCom,p1,p2,p3`
`p1` Channel number
`p2` Tag (up to 32 characters, UTF-8)
`p3` Tag number (up to 16 characters, ASCII)
Query `STagCom[,p1]?`
Example Set the communication channel 025 tag to "SYSTEM1" and the tag number to "TI002."
`STagCom,025,'SYSTEM1','TI002'`

SColorCom

Channel Color (/MC)

Sets the color of a communication channel.

Syntax `SColorCom,p1,p2,p3,p4`
`p1` Channel number
`p2` R value of RGB display colors (0 to 255)
`p3` G value of RGB display colors (0 to 255)
`P4` B value of RGB display colors (0 to 255)
Query `SColorCom[,p1]?`
Example Set the communication channel 025 display color to red.
`SColorCom,025,255,0,0`

Description
- For details on RGB values, see "Description" of the **SColorIO** command.

SZoneCom

Waveform Display Zone (/MC)

Sets the waveform display zone of a communication channel.

Syntax `SZoneCom,p1,p2,p3`
`p1` Channel number
`p2` Zone lower limit [%] (0 to 95)
`p3` Zone upper limit [%] (5 to 100)
Query `SZoneCom[,p1]?`
Example Set the waveform zone of communication channel 025 waveform to 0% to 30%.
`SZoneCom,025,0,30`

SScaleCom

Scale Display (/MC) [GX/GP]

Sets the scale display of a communication channel.

Syntax `SScaleCom,p1,p2,p3`
`p1` Channel number
`p2` Scale display position (Off, 1 to 10)
`p3` Number of scale divisions (4 to 12, C10)
Query `SScaleCom[,p1]?`
Example Display the communication channel 025 scale at display position 1. Display four equally spaced main scale marks.
`SScaleCom,025,1,4`

SBarCom

Bar Graph Display (/MC)

Sets the bar graph display of a communication channel.

Syntax `SBarCom,p1,p2,p3`
`p1` Channel number
`p2` Bar display base position
`Lower` Lower
`Center` Center
`Upper` Upper
`p3` Number of scale divisions (4 to 12)
Query `SBarCom[,p1]?`

Example Display the values of communication channel 025 on a bar graph with the center set as the base position (Center). Display four equally spaced main scale marks.
`SBarCom,025,Center,4`

SPartialCom

Partial Expanded Display (/MC) [GX/GP]

Sets the partial expanded display of a communication channel waveform.

Syntax `SPartialCom,p1,p2,p3,p4`
- `p1` Channel number
- `p2` Partial expanded On/Off (On, Off)
- `p3` Partial expanded boundary position [%] (1 to 99)
- `P4` Partial expanded boundary value

Query `SPartialCom[,p1]?`

Example For channel 025 whose measurement range is 0 to 1.0000 V, display the measured value of 0.7500 V at the 50% position.
`SPartialCom,025,On,50,7500`

Description
- You cannot set this on a “Off” channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- P2=On can be specified when the difference between the span upper and lower limits is 2 digits or greater.

SBandCom

Color Scale Band (/MC)

Sets the color scale band of a communication channel.

Syntax `SBandCom,p1,p2,p3,p4,p5,p6,p7`
- `p1` Channel number
- `p2` Color scale band (Off, In, Out)
- `p3` R value of the color scale band RGB colors (0 to 255)
- `P4` G value of the color scale band RGB colors (0 to 255)
- `p5` B value of the color scale band RGB colors (0 to 255)
- `p6` Upper limit of the color scale band display (span lower limit to span upper limit)
- `p7` Lower limit of the color scale band display (span lower limit to span upper limit)

Query `SBandCom[,p1]?`

Example For communication channel 025, set a blue band in the range of -0.5000 to 1.0000.
`SBandCom,025,In,0,0,255,5000,10000`

Description
- You cannot set this on a “Off” channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- For details on RGB values, see “Description” of the **SColorIO** command.

SAlmMarkCom

Alarm Mark (/MC)

Sets the display of the marker that indicates the specified alarm position of a communication channel.

Syntax `SAlmMarkCom,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14,p15`
- `p1` Channel number
- `p2` Whether to display the alarm mark on the scale (Off, On)
- `p3` Alarm mark type
  - `Alarm` Display the default alarm mark
  - `Fixed` Display the mark with the specified color
- `P4` R value of the RGB mark colors for alarm 1 (0 to 255)
- `p5` G value of the RGB mark colors for alarm 1 (0 to 255)
- `p6` B value of the RGB mark colors for alarm 1 (0 to 255)
- `p7` R value of the RGB mark colors for alarm 2 (0 to 255)
- `p8` G value of the RGB mark colors for alarm 2 (0 to 255)
- `p9` B value of the RGB mark colors for alarm 2 (0 to 255)
- `p10` R value of the RGB mark colors for alarm 3 (0 to 255)
- `p11` G value of the RGB mark colors for alarm 3 (0 to 255)
- `p12` B value of the RGB mark colors for alarm 3 (0 to 255)
- `p13` R value of the RGB mark colors for alarm 4 (0 to 255)
- `p14` G value of the RGB mark colors for alarm 4 (0 to 255)
- `p15` B value of the RGB mark colors for alarm 4 (0 to 255)

Query `SAlmMarkCom[,p1]?`

Example Display the alarm marks for alarms 1 to 4 of communication channel 025 in fixed colors red, brown, orange, and yellow, respectively.
`SAlmMarkCom,025,On,Fixed,255,0,0,165,42,42,255,165,0,255,255,0`

Description
- For details on RGB values, see “Description” of the **SColorIO** command.

SAlmLimit

Rate-of-Change Alarm Interval

Sets the rate-of-change interval of the rate-of-change alarm.

Syntax `SAlmLimit,p1,p2`

`p1` Interval for the low limit on rate-of-change alarm

`1` to `32` Integer multiple of the scan interval

`p2` Interval for the high limit on rate-of-change alarm

`1` to `32` Integer multiple of the scan interval

Query `SAlmLimit?`

Example Set the intervals for the low limit on rate-of-change alarm and high limit on rate-of-change alarm to 10 times and 20 times the scan interval, respectively.

```
SAlmLimit,10,20
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SIndivAlmACK

Individual Alarm ACK

Enables or disables the individual alarm ACK function.

Syntax `SIndivAlmACK,p1`

`p1` Enable or disable (Off, On)

Query `SIndivAlmACK?`

Example Enable the individual alarm ACK function.

```
SIndivAlmACK,On
```

SAlmSts

Alarm Display Hold/Nonhold

Sets the alarm display hold/nonhold operation.

Syntax `SAlmSts,p1`

`p1` Operation

`Hold`

`NonHold`

Query `SAlmSts?`

Example Hold the alarm display until an alarm ACK operation.

```
SAlmSts,Hold
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If the individual alarm ACK is enabled (**SIndivAlmACK** command), p1 is fixed to Hold.

STimer

Timer

Sets a timer.

Do Not Use Timers

Syntax `STimer,p1,p2`

`p1` Timer number (1 to 4)

`p2` Timer type (Off)

Relative Timer

Syntax `STimer,p1,p2,p3,p4,p5,p6`

`p1` Timer number (1 to 4)

`p2` Timer type (Relative)

`p3` Interval: Days (0 to 31)

`P4` Interval: Hours (HH) (00 to 23)

`p5` Interval: Minutes (MM) (00 to 59)

`p6` Reset on Math start (Off, On)

Absolute Timer

Syntax `STimer,p1,p2,p3,p4,p5`

`p1` Timer number (1 to 4)

`p2` Timer type (Absolute)

`p3` Interval (1min, 2min, 3min, 4min, 5min, 6min, 10min, 12min, 15min, 20min, 30min, 1h, 2h, 3h, 4h, 6h, 8h, 12h, 24h)

`P4` Reference time: Hours (HH) (00 to 23)

`p5` Reference time: Minutes (MM) (00 to 59)

Query `STimer[,p1]?`

Example Set timer number 2 to relative timer at 6 hours 30 minutes. Reset the timer when computation starts.

```
STimer,2,Relative,0,6,30,On
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Off, you cannot set p3 or subsequent parameters.
- If p2=Relative and p3=0, you cannot set “00:00” (for p4 and p5).

SMatchTimer

Match Time Timer

Sets a match time timer.

Do Not Use Match Time Timers

Syntax `SMatchTimer,p1,p2`

`p1` Match time timer number (1 to 4)

`p2` Type (Off)

Match Time Timer That Synchronizes Once a Year

Syntax `SMatchTimer,p1,p2,p3,p4,p5,p6,p7`

`p1` Match time timer number (1 to 4)

`p2` Type (Year)

`p3` Start time: Month (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)

`P4` Start time: Day (1 to 31, depends on the month)

`p5` Interval: Hours (HH) (00 to 23)

p6 Interval: Minutes (MM) (00 to 59)
p7 Timer action
Single Single shot
Repeat Repeat

Match Time Timer That Synchronizes Once a Month

Syntax SMatchTimer,p1,p2,p3,p4,p5,p6
p1 Match time timer number (1 to 4)
p2 Type (Month)
p3 Start time: Day (1 to 28)
P4 Interval: Hours (HH) (00 to 23)
p5 Interval: Minutes (MM) (00 to 59)
p6 Timer action
Single Single shot
Repeat Repeat

Match Time Timer That Synchronizes Once a Week

Syntax SMatchTimer,p1,p2,p3,p4,p5,p6
p1 Match time timer number (1 to 4)
p2 Type (Week)
p3 Start time: Day of week
Sun
Mon
Tue
Wed
Thu
Fri
Sat
P4 Interval: Hours (HH) (00 to 23)
p5 Interval: Minutes (MM) (00 to 59)
p6 Timer action
Single Single shot
Repeat Repeat

Match Time Timer That Synchronizes Once a Day

Syntax SMatchTimer,p1,p2,p3,p4,p5
p1 Match time timer number (1 to 4)
p2 Type (Day)
p3 Interval: Hours (HH) (00 to 23)
P4 Interval: Minutes (MM) (00 to 59)
p5 Timer action
Single Single shot
Repeat Repeat

Query SMatchTimer[,p1]?

Example Sets match time timer number 2 to a timer that operates on 21 hours 30 minutes on April 17 every year.
SMatchTimer,2,Year,Apr,17,21,30,Repeat

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Off, you cannot set p3 or subsequent parameters.

SEventAct

Event Action

Sets an event action.

Syntax SEventAct,p1,p2,p3,p4,p5,p6,p7
SEventAct,p1,p2,p3,p4,p5,p6,p7,p8
SEventAct,p1,p2,p3,p4,p5,p6,p7,p8,p9
SEventAct,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10
p1 Event action number (1 to 50)
p2 Type (Off, On)
p3 Event type (see the table below)
P4 Source element number (see the table below)
p5 Event details (see the table below)
p6 Operation mode (see the table below)
p7 Action type (see the table below)
p8 Source element number (see the table below)
p9 Action detail 1 (see the table below)
p10 Action detail 2 (see the table below)

p3 Event Type	Value	P4 Source Element Number	p5 Event details	p6 Operation mode
Internal Switch	SW	1 to 100	-	Rising, Falling, Both
Remote control input	DI	Channel number	-	Rising, Falling, Both
Relay (DO channel)	DO	Channel number	-	Rising, Falling, Both
Alarm (I/O channel)	AlarmIO	Channel number	1 to 4	Rising, Falling, Both
Alarm (math channel)	AlarmMath	Channel number	1 to 4	Rising, Falling, Both
Alarm (communication channel)	AlarmCom	Channel number	1 to 4	Rising, Falling, Both
Alarm	AlarmAll	-	-	Rising, Falling, Both
Device status	Status	-	Memory (Record)	Rising, Falling, Both
			Math (Math)	
			UserLock (User lock out)	
			Login (Under login)	
			MemMediaErr (Memory/Media error)	
			MeasureErr (Measurement error)	
			CommErr (Communication error)	
Timer	Timer	1 to 4	-	Edge
Match time timer	MatchTimeTimer	1 to 4	-	Edge
User function	User function	1 to 2	-	Edge

Conditions p6	p7 Action Type	Value	p8 Source Element Number	p9 Action Detail 1	p10 Action Detail 2
Rising, Falling, Edge	Recording	Memory	-	Start, Stop, Reset	-
	Math (math channel)	Math	-	Start, Stop, Reset	-
	Display rate switch [GX/GP]	RateChange	1, 2	-	-
	Flag	Flag	1 to 20	-	-
	Manual sample	ManualSample	-	-	-
	DO output[1]	DO	Channel number	Off, On	-
	Output to an internal switch[2]	SW	Channel number	Off, On	-
	Alarm ACK	AlarmACK	-	-	-
	Snapshot [GX/GP]	Snapshot	-	-	-
	Time adjustment	TimeAdjust	-	-	-
	Display data save	SaveDisplay	-	-	-
	Event data save	SaveEvent	1	-	-
	Event trigger[3]	Trigger	1	-	-
	Message	Message	1 to 100	All, Select	1 to 50 1 to 60 (for GX20-2/ GP20-2)
	Display group change [GX/GP]	GroupChange	1 to 50	-	-
	Relative timer reset	TimerReset	1 to 4	-	-
	Settings load	ConfigLoad	1 to 10	-	-
	Settings save [GM]	ConfigSave	1 to 10	-	-
	Favorite screen display [GX/GP]	PlayList	1 to 20	-	-
Both	Recording start/stop	MemoryStartStop	-	-	-
	Math start/stop	MathStartStop	-	-	-
	Display rate switch 1/2 [GX/GP]	RateChange1_2	1 or 2	-	-
	Flag On/Off	FlagOn_Off	1 to 20	-	-
	DO On/Off[1]	DOOn_Off	Channel number	-	-
	Internal switch on/off[2]	SWOn_Off	Channel number	-	-

1 Can be output only to DO whose type is set to Manual.
2 Can be output only to SW whose type is set to Manual.
3 Valid when the advanced security function (/AS) is disabled.

Query `SEventAct[,p1]?`
Invalid parameters are returned as blanks in queries.

Example Execute memory start on the rising edge of the remote control input (channel 0101). Use event action number 2.
```
SEventAct,2,On,DI,0101,,Rising,Memory,,Start
```

Description

- There are limitations to event and action combinations. For details, see section 1.14 in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN) or section 2.15, "Configuring the Event Action Function," in the *Data Acquisition System GM User's Manual (IM 04L55B01-01EN).*
- Write only delimiters (commas) for irrelevant parameters (invalid even if a value is specified).
- Event type "DI" is the channel of the DI module that has been set to remote module (**SModeDI** command).
- You can specify p3 = Status and p6 = Both when an item that can be specified as an action (flag, DO channel, or internal switch) is valid.
- Math channel and flag are an option (/MT).
- Communication channels are an option (/MC).

SReport

Report Type (/MT)

Sets the type of report to create.

No Reports

Syntax `SReport,p1`
`p1` Type (Off)

Hourly and Daily Reports

Syntax `SReport,p1,p2`
`p1` Type (Hour+Day)
`p2` Time to create reports: Hour (HH) (00 to 23)

Daily and Weekly Reports

Syntax `SReport,p1,p2,p3`
`p1` Type (Day+Week)
`p2` Day to create reports (Mon, Tue, Wed, Thu, Fri, Sat, Sun)
`p3` Time to create reports: Hour (HH) (00 to 23)

Daily and Monthly Reports

Syntax `SReport,p1,p2,p3`
`p1` Type (Day+Month)
`p2` Day to create reports (1 to 28)
`p3` Time to create reports: Hour (HH) (00 to 23)

Batch Reports

Syntax `SReport,p1,p2`
`p1` Type (Batch)
`p2` Recording interval (2min, 3min, 4min, 5min, 10min, 15min, 30min, 1h)

Day Custom Reports

Syntax `SReport,p1,p2,p3,p4,p5`
`p1` Type (Custom)
`p2` Recording interval (2min, 3min, 4min, 5min, 10min, 15min, 30min, 1h)
`p3` File creation interval (4h, 6h, 8h, 12h, 24h)
`P4` Time to create reports: Hour (HH) (00 to 23)
`p5` Time to create reports: Minute (MM) (00 to 59)

Query `SReport[,p1]?`

Example Create daily reports at 09:00 every day and monthly reports at 09:00 on the first day of each month.
```
SReport,Day+Month,1,09
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p1=Off, you cannot set p2 or subsequent parameters.

SRepData

Report Data (/MT)

Sets the data type and file type of reports.

Syntax `SRepData,p1,p2,p3,p4,p5,p6`

p1 Data type 1 (Max, Min, Ave, Sum, Inst)
p2 Data type 2 (Off, Max, Min, Ave, Sum, Inst)
p3 Data type 3 (Off, Max, Min, Ave, Sum, Inst)
P4 Data type 4 (Off, Max, Min, Ave, Sum, Inst)
p5 Data type 5 (Off, Max, Min, Ave, Sum, Inst)
- Off No
- Max Maximum value
- Min Minimum value
- Ave Average value
- Sum Integrated value
- Inst Instantaneous value

p6 File type
- Combine 1 file
- Separate Separate

Query SRepData?

Example Record the maximum, minimum, and average values in daily and monthly reports. Generate the daily and monthly reports in a single file.
```
SRepData,Max,Min,Ave,Off,Combine
```

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SRepTemp

Report Output (/MT)

Sets the report output mode.

Syntax SRepTemp,p1,p2,p3

p1 EXCEL template
- Off Disabled
- On Enabled

p2 PDF output (Off, On)
p3 Printer output (Off, On)

Query SRepTemp?

Example Generate reports that use the Excel template.
```
SRepTemp,On,Off,Off
```

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SDigitalSign

Electronic Signature Inclusion (/MT)

Sets whether to include an electronic signature in report template output PDF files.

Syntax SDigitalSign,p1,p2

p1 Signature target (PDF)
p2 Electronic signature inclusion (Off, On)

Query SDigitalSign[p1]?

Example Include an electronic signature in report template output PDF files.
```
SDigitalSign,PDF,On
```

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SRepCh

Report Channel (/MT)

Assigns a channel to a report channel.

Not Assign a Channel

Syntax SRepCh,p1,p2

p1 Report Channel Number
p2 Usage (Off)

Assign a Channel

Syntax SRepCh,p1,p2,p3,p4

p1 Report Channel Number
p2 Usage
- IO I/O channel
- Math Math channel
- Com Communication channel

p3 Channel number
P4 Sum scale (Off, /sec, /min, /hour, /day)

Query SRepCh[,p1]?

Example Assign I/O channel 0002 to report channel 1. Set the sum scale to Off.
```
SRepCh,001,IO,0002,Off
```

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Off, you cannot set p3 or subsequent parameters.
- Communication channels are an option (/MC).

SLcd

LCD [GX/GP]

Sets the brightness and backlight saver of the LCD.

Syntax `SLcd,p1,p2,p3,p4`

`p1` Brightness (1 to 6)

`p2` Backlight saver mode

`Off`	Not used
`Dimmer`	Dimmer
`TimeOff`	Off

`p3` Backlight saver saver time (1min, 2min, 5min, 10min, 30min, 1h)

`P4` Backlight saver restore

`Key+Touch`	Key or touchscreen
`Key+Touch+Alarm`	Key, touchscreen, or alarm

Query `SLcd?`

Example Set the LCD brightness to 3 and the screen backlight saver type to DIMMER. Set the amount time of until the GX/GP switches to saver mode to 5 minutes and the event that causes the GX/GP to return from saver mode to the pressing of a key and tapping of the touchscreen.

```
SLcd,3,Dimmer,5min,Key+Touch
```

Description

- p3 and subsequent parameters are valid when p2=Off.

SViewAngle

View Angle [GX/GP]

Set the view angle.

Syntax `SViewAngle,p1`

`p1` View Angle

`Upper`	Easy to view from above
`Lower`	Easy to view from below

Query `SViewAngle?`

Example Set the view angle so that it is easy to view from above.

```
SViewAngle,Upper
```

Description

- This command is valid for the GX10/GP10.

SBackColor

Screen Background Color [GX/GP]

Sets the screen background color.

Syntax `SBackColor,p1,p2,p3`

`p1` R value of RGB background colors (0 to 255)

`p2` G value of RGB background colors (0 to 255)

`p3` B value of RGB background colors (0 to 255)

Query `SBackColor?`

Example Set the background color to black.

```
SBackColor,0,0,0
```

Description

- For details on RGB values, see “Description” of the **SColorIO** command.

SGrpChange

Automatic Group Switching Time [GX/GP]

Sets the time for automatically switching between display groups.

Syntax `SGrpChange,p1`

`p1` Automatic group switching time (5s, 10s, 20s, 30s, 1min)

Query `SGrpChange?`

Example Set the switching time to 1 minute.

```
SGrpChange,1min
```

SAutoJump

Jump Default Display Operation [GX/GP]

Sets the amount of time that must elapse until the GX/GP returns to the specified screen (standard screen) when there is no user interaction.

Syntax `SAutoJump,p1`

`p1` Jump default display operation (Off, 1min, 2min, 5min, 10min, 20min, 30min, 1h)

Query `SAutoJump?`

Example Set the automatic return time to 5 minutes.

```
SAutoJump,5min
```

SCalFormat

Calendar Display Format [GX/GP]

Sets the calendar display format.

Syntax `SCalFormat,p1`

`p1` 1st weekday (Sun, Mon)

Query `SCalFormat?`

Example Set the first weekday to Monday.

```
SCalFormat,Mon
```

SBarDirect

Bar Graph Display Direction [GX/GP]

Sets the bar graph display direction.

Syntax `SBarDirect,p1`

`p1` Direction

`Horizontal`	Horizontal
`Vertical`	Vertical

Query `SBarDirect?`

Example Display bar graphs horizontally.

```
SBarDirect,Horizontal
```

SChgMonitor

Value Modification from the Monitor

Enables or disables the feature that allows values to be changed from the monitor.

Syntax `SChgMonitor,p1`

p1 Disable or enable (Off, On)

Query SChgMonitor?

Example Enable the feature that allows values to be changed from the monitor.
SChgMonitor,On

STrdWave

Trend Waveform Display [GX/GP]

Sets the trend waveform display mode.

Syntax STrdWave,p1,p2

p1 Waveform display direction

Horizontal	Horizontal
Vertical	Vertical

p2 Trend clear

Off	Do not clear
On	Clear

Query STrdWave?

Example Set the trend waveform to horizontal display and clear the waveform when recording is started.
STrdWave,Vertical,On

STrdScale

Scale [GX/GP]

Set the scale.

Syntax STrdScale,p1,p2,p3

p1 Number of digits to display for scale values.

Normal	Normal
Fine	Fine

p2 Current value display

Mark	Mark
Bar	Bar graph

p3 Number of digits to display for channels that are added to the current value mark

0-digit	0 digits (not show channel numbers)
3-digit	3 digits
4-digit	4 digits

Query STrdScale?

Example Set the number of digits to display for scale values to “Fine,” display the value indicators on a bar graph, and set the number of digits to display for channels that are added to the current value mark to 4 digits.
StrdScale,Fine,Bar,4-digit

STrdLine

Trend Line Width, Grid [GX/GP]

Sets the trend waveform line width and the grid in the display area.

Syntax STrdLine,p1,p2

p1 Line width

Thick	Thick
Normal	Normal
Thin	Thin

p2 Grid

Auto	Auto
4 to 12	Number of grid lines

Query STrdLine?

Example Set the trend waveform line width to “Thin” and the number of grid lines to 10.
StrdLine,Thin,10

STrdRate

Trend Interval Switching [GX/GP]

Sets the trend interval switching.

Syntax STrdRate,p1,p2

p1 Trend interval switching

Off	Not switch
On	Switch

p2 Second trend interval (5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min, 1h, 2h, 4h, 10h).

Query STrdRate?

Example Set the second trend interval to 30 seconds.
STrdRate,On,30s

Description

- You cannot set parameter p1 while recording is in progress.
- You cannot set parameter p1 while computation is in progress.
- p2 is valid only when p1=On.
- You cannot choose a second trend interval that is shorter than the scan interval.
- Trend intervals shorter than 30 s cannot be specified if an electro-magnetic relay type analog input module is in use (set up).

STrdKind

Trend Type [GX/GP]

Sets the type of trend waveform to display.

Syntax STrdKind,p1

p1 Type

Fixed to "T-Y"	

Query STrdKind?

Example Display using rectangular coordinates.
STrdKind,T-Y

STrdPartial

Partial Expanded Trend Display [GX/GP]

Enable or disable the partial expanded trend display.

Syntax STrdPartial,p1

p1 Disable or enable (Off, On)

Query STrdPartial?

Example Enable the partial expanded trend display.
STrdPartial,On

SMsgBasic

Message Writing

Sets the message writing operation.

Syntax `SMsgBasic,p1,p2,p3`

`p1` Message writing method
(GX/GP: Common, Separate)
(GM: Common)

`Common`	Write messages to all display groups.
`Separate`	Write messages to only the groups that are displayed.

`p2` Power failure message (Off, On)

`p3` Change message (Off, On)
(GX/GP: On, Off)
(GM: Off)

Query `SMsgBasic?`

Example Write messages to only the groups that are displayed. Enable the power failure message and change message.
`SMsgBasic,Separate,On,On`

SGroup

Display Group

Sets the display group.

Syntax `SGroup,p1,p2,p3,p4`

`p1` Group number

`p2` Enable or disable (Off, On)

`p3` Group name (up to 16 characters, UTF-8)

`P4` Channel string

- Specify using channel numbers. 4-digit numbers for I/O channels. Numbers that start with “A” for math channels (A015). Numbers that start with “C” for communication channels (C020). The maximum number of characters per channel is 4.
- Use periods to separate channel numbers (see example).

Query `SGroup[,p1]?`
The channel string is output exactly as it is specified.

Example Assign channels 0001, 0003, 0005, A001, and C023 to group 2 and name it “GROUP A.”
`SGroup,2,On,'GROUP A','1.3.5.A1.C23'`

STripLine

Display Group Trip Line

Sets a trip line for a display group.

Syntax `STripLine,p1,p2,p3,p4,p5,p6,p7,p8`

`p1` Group number

`p2` Trip line number (1 to 4)

`p3` Enable or disable (Off, On)

`P4` Display position [%] (1 to 100)

`p5` R value of RGB display colors (0 to 255)

`p6` G value of RGB display colors (0 to 255)

`p7` B value of RGB display colors (0 to 255)

`p8` Line width
(GX/GP: Thin, Normal, Thick)
(GM: Normal)

`Thin`	Thin
`Normal`	Normal
`Thick`	Thick

Query `STripLine[,p1[,p2]]?`

Example Display trip line 2 using a thick line in red at the 80% position of group 2.
`STripLine,2,2,On,80,255,0,0,Thick`

Description

- p4 and subsequent parameters are valid only when p3=On.
- For details on RGB values, see “Description” of the **SColorIO** command.

SSclBmp

Scale Bitmap Image Usage [GX/GP]

Sets whether to display a bitmap scale image in the trend display of a display group.

Syntax `SSclBmp,p1,p2`

`p1` Group number

`p2` Enable or disable (Off, On)

Query `SSclBmp[,p1]?`

Example Use a bitmap scale image on display group 3.
`SSclBmp,3,On`

Description

- Specify the bitmap file to use from the front panel of the GX/GP.

SMessage

Message

Sets messages.

Syntax `SMessage,p1,p2`

`p1` Message number (1 to 100)

`p2` Message string (up to 32 characters, UTF-8)

Query `SMessage[,p1]?`

Example Assign character string “MESSAGE77” to message number 77.
`SMessage,77,'MESSAGE77'`

STimeZone

Time Zone

Sets the time zone.

Syntax `STimeZone,p1,p2`
- `p1` Time zone: Hour (-13 to 13)
- `p2` Time zone: Minute (0 to 59)

Query `STimeZone?`

Example Set the time offset to 9 hours ahead of GMT.
`STimeZone,9,0`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SDateBasic

Gradual Time Adjustment

Sets the gradual time adjustment feature.

Syntax `SDateBasic,p1,p2`
- `p1` Boundary value for gradually adjusting the time (Off, 5s, 10s, 15s)
- `p2` Action to take when the boundary value for gradually adjusting the time is exceeded.
  - `NotChange` Do not change
  - `Change` Change

Query `SDateBasic?`

Example Set the boundary value to 15 seconds. When the offset exceeds the boundary value, do not change the time.
`SDateBasic,15s,NotChange`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SDateFormat

Date Format

Sets the date format.

Syntax `SDateFormat,p1,p2,p3`
- `p1` Date format
  - `YYMMDD` Year, month, day
  - `MMDDYY` Month, day, year
  - `DDMMYY` Date, month, year
- `p2` Delimiter
  - `/` Slash
  - `.` Dot (period)
  - `-` Hyphen
- `p3` Month display
  - `Digit` Display the month using numerals (1 to 12)
  - `Letter` Display the month using characters (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)

Query `SDateFormat?`

Example Set the date format to “year, month, day,” and display the month using numerals.
`SDaeFormat,YYMMDD,/,Digit`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SDst

Daylight Saving Time

Set the daylight saving time.

Syntax `SDst,p1,p2,p3,p4,p5,p6,p7,p8,p9`
- `p1` Enable or disable (Use, Not)
- `p2` Start time: Month (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
- `p3` Start time: Week (1st, 2nd, 3rd, 4th, Last)
- `P4` Start time: Weekday (Sun, Mon, Tue, Wed, Thu, Fri, Sat)
- `p5` Start time: Hour (0 to 23)
- `p6` End time: Month (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
- `p7` End time: Week (1st, 2nd, 3rd, 4th, Last)
- `p8` End time: Weekday (Sun, Mon, Tue, Wed, Thu, Fri, Sat)
- `p9` End time: Hour (0 to 23)

Query `SDst?`

Example Switch to daylight saving time at hour 0 on the first Sunday of June and switch back at hour 0 on the first Sunday of December.
`SDst,On,Jun,1st,Sun,0,Dec,1st,Sun,0`

SLang

Language

Sets the language to use.

Syntax `SLang,p1`
- `p1` Language (Japanese, English, German, French, Chinese, Russian, Korean)

Query `SLang?`

Example Set the language to Japanese.
`SLang,Japanese`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If you change the language with this command, the recorder may restart.

STemp

Temperature Unit

Sets the temperature unit.

Syntax `STemp,p1`

`p1` Temperature unit

- `C` Celsius
- `F` Fahrenheit

Query `STemp?`

Example Set the temperature unit to Celsius.

```
STemp,C
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SDPoint

Decimal Point Type

Sets the decimal point type.

Syntax `SDPoint,p1`

`p1` Decimal point type

- `Point` Use points.
- `Comma` Use commas.

Query `SDPoint?`

Example Use a comma for the decimal point.

```
SDPoint,Comma
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SFailAct

Fail Relay Operation (/FL) [GX/GP]

Sets the fail relay (DO channel) operation.

Syntax `SFailAct,p1`

`p1` Operation

- `Fail` Output fail information.
- `Status` Output instrument information.

Query `SFailAct?`

Example Output fail signals from the fail relay (DO channel).

```
SFailAct,Fail
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SFailSts

Instrument Status to Output (/FL) [GX/GP]

Sets the instrument status to output from the fail relay (DO channel).

Syntax `SFailSts,p1,p2,p3,p4,p5`

- `p1` Memory/media status (Off, On)
- `p2` Measurement error (Off, On)
- `p3` Communication error (Off, On)
- `P4` Recording stop (Off, On)
- `p5` Alarm (Off, On)

Query `SFailSts?`

Example Output all information.

```
SFailSts,On,On,On,On,On
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.

SPrinter

Printer

Sets the printer.

Syntax `SPrinter,p1,p2,p3,p4,p5,p6,p7`

- `p1` IP address (0. 0. 0. 0 to 255. 255. 255. 255)
- `p2` Paper size (A4, A3, Letter)
- `p3` Paper orientation (Horizontal, Vertical)
- `P4` Resolution [dpi] (300, 600)
- `p5` Number of copies (1 to 10)
- `p6` Snapshot (Off, On)
  (GX/GP: Off, On)
  (GM: Off)
- `p7` Fit to page during snapshot printing (Off, On)
  (GX/GP: Off, On)
  (GM: Off)

Query `SPrinter?`

Example Set the IP address to “192.168.111.24,” the paper size to A3, the paper orientation to horizontal, the resolution to 600, the number of copies to 2, and snapshot to On. Print by fitting to page.

```
Sprinter,192.168.111.24,A3,Horizon
tal,600,2,On,On
```

SLed

LED Indicator Operation [GX/GP]

Sets the operation of the LED indicators on the front panel.

Syntax `SLed,p,p2`

- `p1` Type (Function)
- `p2` Operation
  - `Off` Power state

`AlarmAll` Alarm

Query `SLed?`

Example Set the LED indicator operation to “Alarm.”
`SLed,Function,AlarmAll`

SSound

Sound [GX/GP]

Sets touch and warning sounds.

Syntax `SSound,p1,p2`
`p1` Touch sound (Off, On)
`p2` Warning sound (Off, On)

Query `SSound?`

Example Enable touch and warning sounds.
`SSound,On,On`

SInstruTag

Instruments Tag

Sets tags.

Syntax `SInstruTag,p1,p2`
`p1` Tag (up to 32 characters, UTF-8)
`p2` Tag number (up to 16 characters, ASCII)

Query `SInstruTag?`

Example Set the tag to assign to the GX/GP to “GX” and the tag number to “12345.”
`SinstruTag,'GX','12345'`

SConfCmt

Setting File Comment

Sets the setting file comment.

Syntax `SConfCmt,p1`
`p1` Setting file comment (up to 50 characters, UTF-8)

Query `SConfCmt?`

Example Set “SETTING FILE COMMENT.”
`SConfCmt,'SETTING FILE COMMENT'`

SUsbInput

USB Input Device [GX/GP]

Specifies the USB input device.

Syntax `SUsbInput,p1`
`p1` USB input device type
`Japanese_109` Japanese keyboard
`English_104` English keyboard
`Barcode` Bar-code reader

Query `SUsbInput?`

Example Specify the English keyboard.
`SUsbInput,English_104`

Description

- This command is valid on models with the /UH USB interface option.
- For the communication commads that you can execute using a bar-code reader, see section 1.18.11, “Setting USB Input Devices (/UH option)” in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual* (IM 04L51B01-01EN).

SSetComment

Configuration Changes Comment (/AS)

Sets whether to enter comments when settings are changed.

Syntax `SSetComment,p1`
`p1` Enable/disable configuration changes comment
`On` Show the save setting screen (allow comment input)
`Off` Change settings without showing the save setting screen.

Query `SSetComment?`

Example Enter comments when settings are changed.
`SSetComment,On`

SSwitch

Internal Switch Operation

Sets the internal switch operation.

Syntax `SSwitch,p1,p2,p3`
`p1` Internal switch number (1 to 100)
`p2` Output type
`Alarm` Output alarms
`Manual` Specify the output value
`p3` Operation
`And` Operate when all set alarms are in the alarm state.
`Or` Operate when any of the set alarms are in the alarm state.

Query `SSwitch[,p1]?`

Example Output an alarm on internal switch 3. Use “OR” logic.
`SSwitch,3,Alarm,Or`

Description

- p3 is valid when p2=Alarm.

SSerialBasic

Serial Communication Basics (/C2 or /C3)

Sets basic serial communication parameters.

Not Use

Syntax `SSerialBasic,p1`

`p1` Function (Off)

Normal/Bar-code

Syntax `SSerialBasic,p1,p2,p3,p4,p5,p6,p7`

`p1` Function (Normal)
(GX/GP: Normal, Barcode, Darwin)
(GM: Normal, Darwin)

`p2` Address (1 to 99)

`p3` Baud rate [bps] (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200)

`P4` Parity (Odd, Even, None)

`p5` Stop bits (1, 2)

`p6` Data length [bit] (7, 8)

`p7` Handshaking (Off:Off, XON;XON, XON:RS, CS:RS)

Modbus Master and Modbus Slave

Syntax `SSerialBasic,p1,p2,p3,p4,p5`

`p1` Function (Master, Slave)

`p2` Address (1 to 247)

`p3` Baud rate [bps] (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200)

`P4` Parity (Odd, Even, None)

`p5` Stop bits (1, 2)

Query `SSerialBasic?`

Example Set the baud rate to 9600, the data length to 8, the parity check to ODD, the stop bits to 1, the handshaking to OFF:OFF, the address to 02, and the protocol to NORMAL.

```
SSerialBasic,Normal,2,9600,Odd,1,8
,Off:Off
```

Description

- You can set p1=Master only on recorders that have the /MC option.
- The settings specified with this command takes effect with the **OSeriApply** command. The recorder serial settings do not change until you send the OSeriApply command.
- For the communication commads that you can execute using a bar-code reader, see section 1.18.11, “Setting USB Input Devices (/UH option)” in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual* (IM 04L51B01-01EN).

SModMaster

Modbus Master (/C2/MC or /C3/MC)

Sets the Modbus master operation.

Syntax `SModMaster,p1,p2,p3,p4,p5,p6`

`p1` Master function (Off, On)

`p2` Read cycle (100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 20s, 30s, 1min)

`p3` Communication timeout (100ms, 200ms, 250ms, 500ms, 1s, 2s 5s, 10s, 1min)

`P4` Gap between messages (Off, 5ms, 10ms, 20ms, 50ms, 100ms)

`p5` Recovery action: retransmission (Off, 1, 2, 3, 4, 5, 10, 20)

`p6` Recovery action: wait time (Off, 5s, 10s, 30s, 1min, 2min, 5min)

Query `SModMaster?`

Example Set the read cycle to 500ms, the communication timeout to 250ms, the gap between messages to 10ms, the retransmission to 2, and the recovery wait time to 5min.

```
SModMaster,On,500ms,250ms,2,5min
```

SModMCmd

Modbus Master Transmission Command (/C2/MC or /C3/MC)

Sets a transmit command of the Modbus master.

Syntax `SModMCmd,p1,p2,p3,p4,p5,p6,p7,p8`

`p1` Command number (1 to 100)

`p2` Command type

- `Off` Disable command
- `Write` Write a value to a Modbus register of another device
- `Read` Read a value from a Modbus register of another device

`p3` Slave number (1 to 247)

`P4` Data type

- `BIT` Bit String data
- `INT16` 16-bit signed integer
- `UINT16` 16-bit unsigned integer
- `INT32_B` 32-bit signed integer (big endian)
- `INT32_L` 32-bit signed integer (little endian)
- `UINT32_B` 32-bit unsigned integer (big endian)
- `UINT32_L` 32-bit unsigned integer (little endian)
- `FLOAT_B` 32-bit floating point (big endian)
- `FLOAT_L` 32-bit floating point (little endian)

`p5` Register (1 to 465535)

`p6` Channel type

- `IO` I/O channel
- `Math` Math channel
- `Com` Communication channel

`p7` First channel

`p8` Last channel

Query `SModMCmd[p1]?`

Example Register the following command in command number 2: read the 32-bit signed integer data that is assigned to registers 30003 (upper 16 bits) and 30004 (lower 16 bits) in the slave device assigned to address 5 into channel C002.
```
SModMCmd,2,Read,5,INT32_B,30003,
Com,002,002
```

Description
- If p2=Read, set the communication channel in p6, p7, and p8.
- Set the same type of channel in p7 and p8.
- Math channels are an option (/MT).
- For details on data types, registers, and channel types, see section 4.5.1, “Modbus Client and Master Function” in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual* (IM 04L51B01-01EN) or section 4.5.1, “Modbus Client/Master Function,” in the *Data Acquisition System GM User’s Manual (IM 04L55B01-01EN).*

SSerialAutoLOut

Auto Logout for Serial Communication (/C2 or /C3)

Sets the auto logout function for serial communication.

Syntax `SSerialAutoLOut,p1`
- `p1` Auto logout function (Off, 1min, 2min, 5min, 10min)

Query `SSerialAutoLOut?`

Example Set the auto logout time for users logged in through serial communication to 1 minute.
```
SSerialAutoLOut,1min
```

Description
- Auto logout is applied to users logged in through serial communication when the communication security function is set to Login (p2 of the **SSecurity** command) and the receiver function setting in the basic serial settings (p1 of the **SSerialBasic** command) is set to Normal.

SIpAddress

IP Address Information

Sets the IP address information.

Syntax `SIpAddress,p1,p2,p3`
- `p1` IP address (0.0.0.0 to 255.255.255.255)
- `p2` Subnet mask (0.0.0.0 to 255.255.255.255)
- `p3` Default gateway (0.0.0.0 to 255.255.255.255)

Query `SIpAddress?`

Example Set the IP address to 192.168.111.24, the subnet mask to 255.255.255.0, and the default gateway to 192.168.111.20.
```
SIpAddress,192.168.111.24,255.255.
255.0,192.168.111.20
```

Description
- The settings specified with this command takes effect with the **OIPApply** command. The recorder IP address does not change until you send the OIPApply command.

SClient

Client Function

Sets the client function.

Syntax `SClient,p1,p2`
- `p1` Client type (FTP, SMTP, SNTP, MODBUS, WATT)
- `p2` Client Function (Off, On)

Query `SClient[p1]?`

Example Use the FTP client function.
```
SClient,FTP,On
```

Description
- Modbus client is valid on models with the /MC communication channel option.
- WT connection client is valid on models with the /E2 WT communication option and the /MC communication channel option.

SClientEncrypt

Client Communication Encryption

Sets whether to encrypt FTP client communication and SMTP client communication.

Syntax `SClientEncrypt,p1,p2,p3`
- `p1` Client type (FTP, SMTP)
- `p2` Encryption (Off, On)
- `p3` Verification of certificate (Off, On)

Query `SClientEncrypt[p1]?`

Example Encrypt FTP client communication. Check that the certificate in the recorder matches the certificate received from the server.
```
SClientEncrypt,FTP,On,On
```

SDns

DNS Information

Sets the DNS information.

Host (GX)

Syntax `SDns,p1,p2,p3`
- `p1` Setting type (Host)
- `p2` Host name (up to 64 characters, ASCII)
- `p3` Domain name (up to 64 characters, ASCII)

DNS Server

Syntax `SDns,p1,p2,p3`
- `p1` Setting type (Server)
- `p2` Primary DNS server (0.0.0.0 to 255.255.255.255)
- `p3` Secondary DNS server (0.0.0.0 to 255.255.255.255)

Suffix Setup

Syntax `SDns,p1,p2,p3`
- `p1` Setting type (Suffix)
- `p2` Primary domain suffix (up to 64 characters, ASCII)
- `p3` Secondary domain suffix (up to 64 characters, ASCII)

Query `SDns[p1]?`

Example Set the IP address of the primary DNS server to 192.168.111.1 and the IP address of the secondary DNS server to 192.168.111.10
```
SDns,Server,192.168.111.1,192.168.111.10
```

Description
- The settings specified with this command takes effect with the **OIPApply** command. The recorder IP address does not change until you send the OIPApply command.

SDhcp

DHCP Client

Sets the DHCP client.

Do Not Obtain the IP Address Automatically

Syntax `SDhcp,p1`
- `p1` Automatic IP address assignment (Off)

Obtain the IP Address Automatically

Syntax `SDhcp,p1,p2,p3`
- `p1` Automatic IP address acquisition (On)
- `p2` DNS information acquisition (Off, On)
- `p3` Automatic host name registration (Off, On)

Query `SDhcp?`

Example Automatically obtain the IP address and DNS information and automatically register the host name.
```
SDhcp,On,On,On
```

Description
- The settings specified with this command takes effect with the **OIPApply** command. The recorder IP address does not change until you send the OIPApply command.

SFtpKind

File to Transfer via FTP

Sets the file to transfer via FTP.

Syntax `SFtpKind,p1,p2`
- `p1` Setting type
  (GX/GP: Data, Report, Snapshot, AlarmSummary, ManualSample, Setting)
  (GM: Data, Report, AlarmSummary, ManualSample, Setting)
  - `Data` Automatically transfer display and event data files when files are generated.
  - `Report` Automatically transfer report data files when files are generated.
  - `Snapshot` Automatically transfer snapshot data files when files are generated.
  - `AlarmSummary` Transfer alarm summaries
  - `ManualSample` Automatically transfer manual sampled data files when manual sampling is executed.
  - `Setting` Automatically transfer the setting file when settings are changed.
- `p2` Enable or disable transfer (Off, On)

Query `SFtpKind[p1]?`

Example Automatically transfer display and event data files.
```
SFtpKind,Data,On
```

Description
- The report function is an option (/MT).
- p1 can be set to Setting when the advanced security function (/AS) is enabled.

SFtpTime

FTP Transfer Time Shift

Sets the amount of time to shift file transfers that are carried out by the FTP client function.

Syntax `SFtpTime,p1,p2`
- `p1` Setting type
  - `Data` Display and event data files
  - `Report` Report files
- `p2` Transfer shift time [minutes] (0 to 120)

Query `SFtpTime[p1]?`

Example Shift (delay) FTP transfers of report data files by 30 minutes.
```
SFtpTime,Report,30
```

Description
- The report function is an option (/MT).

SFtpCnct

FTP Client Connection Destination Server

Sets the FTP client connection destination server

Syntax SFtpCnct,p1,p2,p3,p4,p5,p6,p7

- p1 Server
  - Primary Primary
  - Secondary Secondary
- p2 Server name (up to 64 characters, ASCII)
- p3 Port number (1 to 65535)
- P4 User name (up to 32 characters, ASCII)
- p5 Password (up to 32 characters, ASCII)
- p6 Directory name (up to 64 characters, ASCII)
- p7 PASV mode (Off, On)

Query SFtpCnct[p1]?
The password is displayed using asterisks.

Example For the primary server, assign the name "server1" and port number 21. Set the user name to "Administrator1," the password to "password1," and the directory to "directory1." Set PASV mode to Off.

```
SFtpCnct,Primary,'server1',21,'Administrator1','password1','directory1',Off
```

SSmtpLogin

SMTP User Authentication

Sets the SMTP user authentication method.

Syntax SSmtpLogin,p1

- p1 User authentication type
  - Off Not use authentication.
  - Auth-Smtp Use Authentication SMTP.
  - POP3 Use POP Before SMTP (unencrypted).
  - APOP Use POP Before SMTP (encrypted).

Query SSmtpLogin?

Example Do not use authentication.

```
SSmtpLogin,Off
```

SSmtpCnct

SMTP Client Connection Destination Server

Sets the SMTP client connection destination server

Syntax SSmtpCnct,p1,p2,p3,p4,p5

- p1 Destination server type (SMTP, POP)
- p2 Server name (up to 64 characters, ASCII)
- p3 Port number (1 to 65535)
- P4 User name (up to 32 characters, ASCII)
- p5 Password (up to 32 characters, ASCII)

Query SSmtpCnct[p1]?
The password is displayed using asterisks.

Example Connect to SMTP server "SMTPserver1." Set the port number to 25, the user name to "administrator1," and the password to "password1."

```
SSmtpLogin,SMTP,'SMTPserver1',25,'administrator1','password1'
```

SMailHead

Mail Header

Sets the mail header including the recipient address.

Syntax SMailHead,p1,p2,p3,p4

- p1 Sender address (up to 64 characters, ASCII)
- p2 Recipient address 1 (up to 150 characters, ASCII)
- p3 Recipient address 2 (up to 150 characters, ASCII)
- P4 Character string to add to the subject (up to 32 characters, ASCII)

Query SMailHead?

Example Set the sender address to "recorder1@data.com" and the recipient address to "pc1@data.com." Add "part1" to the subject.

```
SMailHead,'recorder1@data.com','pc1@data.com',,'part1'
```

SMailBasic

Common Section of the Mail Body

Sets the items that are common to the body of all mails.

Syntax SMailBasic,p1,p2

- p1 Header string (up to 128 characters, UTF-8)
- p2 Include source URL (Off, On)

Query SMailBasic?

Example Set the header to "recorder1," and include the source URL.

```
SMailBasic,'recorder1',On
```

SMail

Destination and Behavior for Each Mail Type

Sets the destination and behavior for each mail type.

Alarm Notification

Syntax SMail,p1,p2,p3,p4,p5,p6

- p1 Setting type (Alarm)
- p2 Recipient (Off, 1, 2, 1+2)
  - Off Not send
  - 1 Send to recipient 1
  - 2 Send to recipient 1
  - 1+2 Send to recipient 1 and 2
- p3 Inclusion of instantaneous data (Off, On)
- P4 Alarm action
  - On Send mails when alarms occur
  - On+Off Send mails when alarms occur and when they are cleared

p5 Inclusion of tag number or channel number in subject (Off, On)

Scheduled Transmission

Syntax SMail,p1,p2,p3
- p1 Setting type (Time)
- p2 Recipient (Off, 1, 2, 1+2)
- p3 Inclusion of instantaneous data (Off, On)

Report Notification (/MT)

Syntax SMail,p1,p2
- p1 Setting type (Report)
- p2 Recipient (Off, 1, 2, 1+2)

Media Alarm Notification

Syntax SMail,p1,p2
- p1 Setting type (Media)
- p2 Recipient (Off, 1, 2, 1+2)

Power failure notification

Syntax SMail,p1,p2
- p1 Setting type (Power)
- p2 Recipient (Off, 1, 2, 1+2)

System Error Notification

Syntax SMail,p1,p2
- p1 Setting type (System)
- p2 Recipient (Off, 1, 2, 1+2)

User Lockout Notification (/AS)

Syntax SMail,p1,p2
- p1 Setting type (UserLock)
- p2 Recipient (Off, 1, 2, 1+2)

Query SMail[p1]?

Example Send alarm notifications to recipient 1 when alarms occur and when they are cleared. Include instantaneous data at the time of transmission, and include the tag number or channel number in the subject.
```
SMail,Alarm,1,On,On+Off,On
```

Description

- The report function is an option (/MT).

SMailAlarm

Alarm Notification Mail Target Channels

Detects the alarm status of the specified channels and sends alarm notifications.

Syntax SMailAlarm,p1
- p1 Channel string (up to 249 characters, up to 50 channels)
  - Use channel number to specify the channels. 4-digit numbers for I/O channels. Numbers that start with “A” for math channels (A015). Numbers that start with “C” for communication channels (C020). The maximum number of characters per channel is 4.
  - Use periods to separate channel numbers (see example).
  - To specify all channels from the first channel to the last channel, delimit the channels with a hyphen. An error will occur if there are no valid channels in the hyphen designated channels.

Query SMailAlarm?
The channel string is output exactly as it is specified.

Example Set the target channels to channels 0001 to 0021, 0101, A025, and C003.
```
SMailAlarm,'1-21.101.A25.C3'
```

SMailTime

Scheduled Transmission Times

Sets the scheduled transmission times.

Syntax SMailTime,p1,p2,p3,p4
- p1 Recipient (1 or 2)
- p2 Reference time: Hours (HH) (00 to 23)
- p3 Reference time: Minutes (MM) (00 to 59)
- P4 Interval (1h, 2h, 3h, 4h, 6h, 8h, 12h, 24h)

Query SMailTime[,p1]?

Example Send mail to recipient 1 every day at 08:30.
```
SMailTime,1,08,30,24
```

SSntpCnct

SNTP Client

Sets the SNTP client operation and the connection destination server.

Syntax SSntpCnct,p1,p2,p3,p4,p5,p6,p7
- p1 Server name (up to 64 characters, ASCII)
- p2 Port number (1 to 65535)
- p3 Reference time: Hours (HH) (00 to 23)
- P4 Reference time: Minutes (MM) (00 to 59)
- p5 Access interval (6h, 12h, 24h)
- p6 Timeout (10s, 30s, 90s)
- p7 Time adjust on start action (Off, On)

Query SSntpCnct?

Example Set the server name to “sntpserver1,” the port number to “123,” the timeout to 30s. Query the time every day at 12:00 and at memory start.
```
SSntpCnct,'sntpserver1',123,12,00,
24,30s,On
```

SModClient

Modbus Client Operation (/MC)

Sets the Modbus client operation.

Syntax SModClient,p1,p2,p3,p4
- p1 Read cycle (100ms, 200ms, 500ms, 1s, 2s, 5s, 10s 20s, 30s, 1min)
- p2 Recovery wait time (Off, 5s, 10s, 30s, 1min, 2min, 5min)
- p3 Keep connection (Off, On)
- P4 Connection timeout [s] (1 to 10)

Query SModClient?

Example Set the read cycle to 100ms, the recovery wait time to Off, and the connection timeout to 1 second.
```
SModClient,100ms,off,on,1
```

Description

- This command is valid on models with the /MC communication channel option.

SModCList

Modbus Client Connection Destination Server (/MC)

Sets the Modbus client connection destination server.

Syntax `SModCList,p1,p2,p3`
- `p1` Registration number
- `p2` Server name (up to 64 characters, ASCII)
- `p3` Port number (1 to 65535)

Query `SModCList[,p1]?`

Example Assign server name “recorder1” and port number “502” to registration number 1.
```
SModClient,1,'recorder1',502
```

SModCCmd

Modbus Client Transmission Command (/MC)

Sets the Modbus client transmission command.

Syntax `SModCCmd,p1,p2,p3,p4,p5,p6,p7,p8,p9`
- `p1` Command number
- `p2` Command type
  - `Off` Disable command
  - `Write` Write a value to a Modbus register of another device.
  - `Read` Read a value from a Modbus register of another device.
- `p3` Server number (1 to 16)
- `P4` Unit number (1 to 255)
- `p5` Data type
  - `BIT` Bit String data
  - `INT16` 16-bit signed integer
  - `UINT16` 16-bit unsigned integer
  - `INT32_B` 32-bit signed integer (big endian)
  - `INT32_L` 32-bit signed integer (little endian)
  - `UINT32_B` 32-bit unsigned integer (big endian)
  - `UINT32_L` 32-bit unsigned integer (little endian)
  - `FLOAT_B` 32-bit floating point (big endian)
  - `FLOAT_L` 32-bit floating point (little endian)
- `p6` Register (1 to 465535)
- `p7` Channel type
  - `IO` I/O channel
  - `Math` Math channel
  - `Com` Communication channel
- `p8` First channel
- `p9` Last channel

Query `SModCCmd[p1]?`

Example Register the following command in command number 2: read the 32-bit signed integer data that is assigned to registers 30003 (upper 16 bits) and 30004 (lower 16 bits) in the server device assigned to address 5 and unit number 1 into channel C002.
```
SModCCmd,2,Read,5,1,INT32_B,30003,Com,C002,C002
```

Description
- If p2=Read, set the communication channel in p7, p8, and p9.
- Set the same type of channel in p8 and p9.
- Math channels are an option (/MT).
- For details on data types, registers, and channel types, see section 4.5.1, “Modbus Client and Master Function” in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual* (IM 04L51B01-01EN) or section 4.5.1, “Modbus Client/Master Function,” in the *Data Acquisition System GM User’s Manual (IM 04L55B01-01EN).*

SServer

Server Function

Enables or disables the server function.

Syntax `SServer,p1,p2,p3`
- `p1` Server type (FTP, HTTP, SNTP, MODBUS, GENE, EtherNetIP, DARWIN)
  - GENE General communication
- `p2` Operation (Off, On)
- `p3` Port number (1 to 65535)

Query `SServer[,p1]?`

Example Use the FTP server function.
```
SServer,FTP,On,21
```

Description
- You cannot specify a port number that is used by another function.
- p3 cannot be set to 44818, 2222, 34150, or 34151.
- p3 is invalid when p1 = DARWIN (Darwin compatible communication) or when p1 = EtherNetIP.
- The default port numbers are listed below.

Server type (p1)	Default port number
FTP	21
HTTP	80
SNTP	123
MODBUS	502
GENE	34434

- p1 = EtherNetIP is an option (/E1).
- The settings specified with this command takes effect with the **OIPApply** command.

SServerEncrypt

Server Communication Encryption

Sets server communication encryption.

Syntax `SServerEncrypt,p1,p2`
- `p1` Server type (FTP, HTTP)
- `p2` Encryption (Off, On)

Query `SServerEncrypt[p1]?`

Example Encrypt FTP server communication.
```
SServerEncrypt,FTP,On
```

SKeepAlive

Keepalive

Sets the keepalive function.

Syntax `SKeepAlive,p1`
`p1` Operation (Off, On)
Query `SKeepAlive?`
Example Use keepalive.
`SKeepAlive,On`

STimeOut

Communication Timeout

Sets the communication timeout function.

Syntax `STimeOut,p1,p2`
`p1` Timeout function (Off, On)
`p2` Timeout value [minutes] (1 to 120)
Query `STimeOut?`
Example Enable the communication timeout, and set the timeout value to 3 minutes.
`STimeOut,On,3`

SFtpFormat

FTP Server Directory Output Format

Sets the FTP server directory output format.

Syntax `SFtpFormat,p1`
`p1` FTP server directory output format (MS-DOS, UNIX)
Query `SFtpFormat?`
Example Specify MS-DOS.
`SFtpFormat,MS-DOS`

SModDelay

Modbus Server Delay Response

Sets the Modbus server delay response.

Syntax `SModDelay,p1`
`p1` Delay response (Off, 10ms, 20ms, 50ms)
Query `SModDelay?`
Example Specify no delay response.
`SModDelay,Off`

SModLimit

Modbus Server Connection Limit

Enables or disables the Modbus server connection limit function.

Syntax `SModLimit,p1`
`p1` Connection limit (Off, On)
Query `SModLimit?`
Example Enable connection limit.
`SModLimit,On`

SModList

IP Address to Allow Connection to Modbus Server

Sets the IP address to allow connection to Modbus server.

Syntax `SModList,p1,p2,p3`
`p1` Registration number (1 to 10)
`p2` Enable or disable registration (Off, On)
`p3` IP address (0.0.0.0 to 255.255.255.255)
Query `SModList[,p1]?`
Example Register IP address “192.168.111.24” to registration number 1.
`SModList,1,On,192.168.111.24`

SWattList

WT Communication Connection Server (/E2)

Sets the WT communication connection server.

Syntax `SWattList,p1,p2,p3,p4`
`p1` Registration number
`p2` Enable or disable (On, Off)
`p3` Server name (up to 64 characters, ASCII)
`p4` Model (WT300, WT500, WT1800)
Query `SWattList[,p1]?`
Example Register model WT1800 and server name “Watt01” in registration number 1.
`SWattList,1,On,Watt01,WT1800`

SWattClient

WT Communication Operation (/E2)

Sets the WT communication operation.

Syntax `SWattClient,p1,p2`
`p1` Read cycle (500ms, 1s, 2s, 5s, 10s, 20s, 30s)
`p2` Recovery wait time (5s, 10s, 30s, 1min, 2min, 5min)
Query `SWattClient?`
Example Set the read cycle to 10 seconds and recovery wait time to 2 minutes.
`SWattClient,10,2min`

SWattData

WT Data Allocation to Communication Channel (/E2)

Allocates WT data to a communication channel.

Syntax `SWattData,p1,p2,p3,p4,p5,p6,p7`
`p1` Allocation No
`p2` Enable or disable specification (On, Off)
`p3` Communication channel
`p4` Server registration number
`p5` Data group name (see “Description” and Appendix 6.)
`p6` Data name (see Appendix 6.)

p7 Exponential scaling (-9 to 18), default value 0

Query SWattData[,p1]?

Example In allocation number 1, allocate the RMS voltage of element 1 of the WT1800 assigned to server registration number 2 to communication channel 003.
SWattData,1,On,003,2,Element1,URMS

Description

- The available data groups (p5) vary depending on the model.

p5	Description	Supported Item		
		WT1800	WT500	WT300
Off	Unspecified	Yes	Yes	Yes
Element1	Element 1 data	Yes	Yes	Yes
Element2	Element 2 data	Yes	Yes	Yes
Element3	Element 3 data	Yes	Yes	Yes
Element4	Element 4 data	Yes	—	—
Element5	Element 5 data	Yes	—	—
Element6	Element 6 data	Yes	—	—
ElemHrm1	Element 1 harmonic data	Yes	Yes	Yes
ElemHrm2	Element 2 harmonic data	Yes	Yes	Yes
ElemHrm3	Element 3 harmonic data	Yes	Yes	Yes
ElemHrm4	Element 4 harmonic data	Yes	—	—
ElemHrm5	Element 5 harmonic data	Yes	—	—
ElemHrm6	Element 6 harmonic data	Yes	—	—
SigmaA	First wiring unit data	Yes	Yes	Yes
SigmaB	Second wiring unit data	Yes	—	—
SigmaC	Third wiring unit data	Yes	—	—
Other	Other types of data	Yes	Yes	Yes
DeltaA	First wiring unit delta math data	Yes	—	—
DeltaB	Second wiring unit delta math data	Yes	—	—
DeltaC	Third wiring unit delta math data	Yes	—	—
Delta	Delta math data	—	Yes	—
Motor	Motor option data	Yes	—	—
Aux	Auxiliary input option data	Yes	—	—
Phase	Phase difference data	—	Yes	—

SKdcCnct

KDC Connection Destination (/AS)

Sets the KDC server for the password management.

Syntax SKdcCnct,p1,p2,p3

p1 Connection destination (Primary, Secondary)
- Primary Primary server
- Secondary Secondary server

p2 KDC server name (up to 64 characters, ASCII)

p3 Port number (1 to 65535)

Query SKdcCnct[,p1]?

Example For the primary KDC server, assign the server name “KdcControl1” and port number 88.
SKdcCnct,Primary,KdcControl1,88

SAuthKey

Certification Key (/AS)

Sets the certification key that is used during password management authentication.

Syntax SAuthKey,p1,p2,p3,p4

p1 Host principal (up to 20 characters, ASCII)

p2 Realm name (up to 64 characters, ASCII)

p3 Password (up to 20 characters, ASCII)

p4 Encryption (ARC4, AES128, AES256)

Query SAuthKey?

Example Set the password of host principal “GX10_001” realm “REALM01” to “gDcbwT5,” and the encryption (the same as the server) to AES128.
SAuthKey,GX10_001,REALM01,gDcbwT5,AES128

Description

- Slashes and ampersands cannot be used in p1 or p2.

SDarwinCnvCh

Darwin Channel Conversion (Darwin compatible communication)

Replace Darwin channels with recorder channels.

Syntax SDarwinCnvCh,p1

p1 Darwin model
- Standalone Stand-alone type
- Extension Extended type

Query SDarwinCnvCh?

Example Replace DA100 stand-alone type channels to recorder channels.
SDarwinCnvCh,Standalone

SSecurity

Security Function

Sets the security function.

Syntax SSecurity,p1,p2,p3,p4,p5,p6

p1 Operations on the recorder
(GX/GP: Off, Login, Operate)
(GM: Off)

Off	Disables the security function
Login	Enables the login function
Operate	Enables the function that prohibits touch screen operation

p2 Operations via communication (Off, Login)
p3 Auto logout
(GX/GP: Off, 1min, 2min, 5min, 10min)
(GM: Off)
P4 Operation without login
(GX/GP: Off, On)
(GM: Off)
P5 Password retry (Off, 3, 5)
P6 Enable or disable user ID (On, Off)

Query SSecurity?

Example Use the login function when operating the recorder directly or via communication. When logged in, automatically log out if there is no user activity for 5 minutes. The screen can be changed even when logged out.

```
SSecurity,Login,Login,5min,On
```

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- You cannot use this command to configure settings when logged in as a user (when the user level is User).
- p1 cannot be set to Operate when the advanced security function (/AS) is enabled.
- p5 and p6 are valid when the advanced security function (/AS) is enabled.

SKdc

Password Management (/AS)

Sets the password management.

Syntax SKdc,p1,p2

p1 Enable disable password management (On, Off)
p2 Root user password (between 6 and 20 characters, ASCII)

Query SKdc?

Example Enable password management. Set the root user password to “root3210.”

```
SKdc,On,root3210
```

SOpePass

Password to Unlock Operation [GX/GP]

Sets the password that is used to release the operation lock.

Syntax SOpePass,p1

p1 Password (up to 20 characters, ASCII)

Query SOpePass?

The password is displayed using asterisks.

Example Set the password to “password1.”

```
SOpePass,'password1'
```

Description

- You cannot use this command to configure settings when logged in as a user (when the user level is User).

SOpeLimit

Operation Lock Details [GX/GP]

Sets which operations to lock.

Syntax SOpeLimit,p1,p2

p1 Authority of user

Memory	Memory
Math	Computations
DataSave	Data save
Message	Message
Batch	Batch
AlarmACK	Alarm ACK
Comm	Communication
DispOpe	Touch operation
ChangeSet	Setting operation
DateSet	Date/time settings
File	File operation
System	System operation
Out	Output operation

p2 Free/Lock

Free	Not lock
Lock	Lock

Query SOpeLimit[,p1]?

Example Prohibit operations for changing settings.

```
SOpeLimit,ChangeSet,Lock
```

Description

- You cannot use this command to configure settings when logged in as a user (when the user level is User).

SUser

User Settings

Register users.

Syntax SUser,p1,p2,p3,p4,p5,p6,p7

p1 User number
p2 User level

Off	Not Use
Admin	Administrator level
User	User level

p3 Login mode
(GX/GP: Key, Comm, Key+Comm)
(GM: Comm)

	Key	Log in using touch operation
	Comm	Log in via communication (including Web)
	Key+Comm	Log in using touch operation and via communication.
p4		User name (up to 20 characters, ASCII)
p5		Password (up to 20 characters, ASCII)
p6		Enable or disable user limitation (Off, On)
p7		User limitation number (1 to 10)

Query `SUser[,p1]?`
The password of p5 are displayed using asterisks.

Example Register a user-level user to user number 3. Set the user name to “user10” and the password to “pass012.” Allow login only using touch operation, and specify user limitation number 5.
```
SUser,3,User,Key,'user10','pass012
',On,5
```

Description

- If p1=1, p2 is fixed to Admin. In addition, you cannot set p3 to Comm.
- If p2=Admin, p6 is fixed to Off.
- You cannot enter NULL or spaces in p4 or p5.
- For the characters that you can use in the specified password (p5), see **Appendix 1**.
- You cannot use this command to configure settings when logged in as a user (when the user level is User).

When Using the Advanced Security Function (/AS)

Syntax `SUser,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11`

p1		User number
p2		User level
	Off	Not use
	Admin	Administrator level
	User	User level
	Monitor	Monitor level
p3		Login method
	Key	Log in using touch operation
	Comm	Log in via communication commands (including Web)
	Key+Comm	Log in using touch operation and via communication.
p4		User name (up to 20 characters, ASCII)
p5		Password (between 6 and 20 characters, ASCII)
p6		Enable or disable user limitation (Off, On)
p7		User limitation number (1 to 10)
p8		User ID (up to 20 characters, ASCII) Specify a user ID and password combination that have not been registered in the past.
p9		Password expiration (Off, 1Month, 3Month, 6Month)
p10		Enable or disable sign in property (Off, On)
p11		Sign in property number (1 to 8)

Query `SUser[,p1]?`
The password of p5 and user ID of p8 are displayed using asterisks.

Example Register a user-level user to user number 3. Set the user name to “user10” and the password to “pass012.” Allow login only using touch operation, and specify user limitation number 5.
```
SUser,3,User,Key,'user10','pass012
',On,5
```

Description

- If p1=1, p2 is fixed to Admin. In addition, you cannot set p3 to Comm.
- If p2=Admin, p6 and p10 are fixed to Off.
- If p2=Monitor, p6, p9, and p10 are fixed to Off.
- You cannot enter NULL or spaces in p4 or p5.
- Setting to enable password management (SKdc command)
  - If p2=Off, Admin, or User, p5 is invalid. The response to a query will be blank.
  - p9 is fixed to Off.
- If p2=Off, Admin, or User, when loading settings, and when sending communication commands, only initializing (setting to default) is possible.
- For the characters that you can use in the specified password (p5), see **Appendix 1**.
- You cannot use this command to configure settings when logged in as a user (when the user level is User).

SUserLimit

Authority of User

Sets user operation limitations.

Syntax `SUserLimit,p1,p2,p3`

p1		User limitation number (1 to 10)
p2		Authority of user
	Memory	Memory
	Math	Computations
	DataSave	Data save
	Message	Message
	Batch	Batch
	AlarmACK	Alarm ACK
	Comm	Communication
	DispOpe	Touch operation (cannot be specified on the GM.)
	ChangeSet	Setting operation
	DateSet	Date/time settings
	File	File operation
	System	System operation
	Out	Output operation
	CalibSet	Calibration correction settings (valid only when the advanced security function (/AS option) is in use on instruments whose version is 2.02 or later.)
p3		Free/Lock

Free Not lock
Lock Lock

Query SUserLimit[,p1]?

Example Set user limitation number 1 so that changing settings is prohibited.
SUserLimit,1,ChangeSet,Lock

Description

- You cannot use this command to configure settings when logged in as a user (when the user level is User).

SSignIn

Sign In (/AS)

Sets the sign in record for the measured data file.

Syntax SSignIn,p1,p2,p3
p1 Sign in type (Batch, File)
p2 Sign in at record stop (On, Off)
p3 FTP transfer timing (DataSave, SignIn)

Query SSignIn?

Example When the recording of measured data of a batch process is stopped, switch to the screen for signing in.
SSignIn,Batch,On,Signin

SSignInTitle

Sign In Title (/AS)

Sets the sign in title.

Syntax SSignInTitle,p1,p2,p3
p1 Sign in 1 title (up to 16 alphanumeric and symbol characters)
p2 Sign in 2 title (same as above)
p3 Sign in 3 title (same as above)

Query SSignInTitle?

Example Set the sign in 1, 2, and 3 titles to “Operator 1,” “Supervisor 1,” and “Manager 1,” respectively.
SSignInTitle, ‘Operator 1’, ‘Supervisor 1’, ‘Manager 1’

SSignInLimit

Sign In Property (/AS)

Sets the sign in property.

Syntax SSignInLimit,p1,p2,p3,p4
p1 Sign in property number (1 to 8)
p2 Sign in 1 free/lock (Free, Lock)
p3 Sign in 2 free/lock (Free, Lock)
p4 Sign in 3 free/lock (Free, Lock)

Query SSignInLimit[,p1]?

Example Set a sign in property number 2 to allow the execution of only sign in 1.
SSignInLimit,1,Free,Lock,Lock

SBTPassword

Sets the Bluetooth password (/C8) [GM]

Sets the Bluetooth password.

Syntax SBTPassword,p1,p2
p1 Password usage (On, Off)
p2 Password (up to 20 characters, ASCII)

Query SBTPassword?
The password is displayed using asterisks.

Example Set the password to “PaSswoRD2.”
SBTPPassword,On,’PaSswoRD2’

Description

- You cannot use this command to configure settings when logged in as a user (when the user level is User).

SMonitor

Monitor Screen Display Information [GX/GP]

Sets the monitor screen display information.

Syntax SMonitor,p1,p2

p1 Information type (see the table below)

p2 Status (see the table below)

Information Type		Status
p1	**Description**	**p2**
Digital	Digital value display	Off, On
Scroll	Auto scroll	Off, On
Message	Message display	Stream, List
Trend	All channel/group display	Group, All
Axis	Time axis on historical trend	1, 2, 3, 4, 5, 6, 7, 8
Value	Digital value display on historical trend	4Value, Max, Min
Data	Historical data type	Disp, Event1
DigitalWave	Digital waveform display	Off, On
Alarm	Alarm display	Watch, List
Alarm_Sort	Alarm sort item	Time, Channel, Level, Type
Alarm_Order	Alarm sort order	Ascending, Descending
Alarm_Time	Detailed alarm time	Off, On
Message_Sort	Message sort item	Datatime, WriteTime, Message, Group, User
Message_Order	Message sort order	Ascending, Descending
Memory_Data	Memory data type	Disp, Event1
Overview	Overview display	Grouping, All
Multi_No	Multi panel number	1 to 20
Custom_No	Customized display screen number (/CG)	1 to 30
DigitalPos	Digital display position	Default, Top, Bottom, Left, Right
DigitalLabel	Display string display	Off, On
Modbus_M	Modbus master status display type (/MC)	Overview, List
Modbus_C	Modbus client status display type (/MC)	Overview, List
Watt	WT communication status display type (/E2)	Overview, List
Switch	Internal switch/DO status display	All, 1, 2, 3, 4

Query SMonitor[,p1]?

Example Set the trend display to all-channel display.

SMonitor,Trend,All

Description

- Custom_No is an option (/CG).
- Modbus_M and Modbus_C are an option (/MC).
- Watt is an option (/E2).
- When p1 = Switch, p2 = 3 or 4 is valid only for the GX10/GP10.

SMultiPattern

Multi Panel Division [GX/GP]

Sets the multi panel multi panel pattern.

Syntax SMultiPattern,p1,p2,p3

p1 Registration number (1 to 20)

p2 Multi panel pattern

Wide2	Split 2 Wide
Tall2	Split 2 Tall
Wide3	Split 3 Wide
Tall3	Split 3 Tall
Split4	Split 4 Even
Even5	Split 5 Even
Odd5	Split 5 Odd
Even6	Split 6 Even
Odd6	Split 6 Odd

p3 Multi panel name (up to 16 characters, UTF-8)

Query SMultiPattern[,p1]?

Example Set the panel of registration number 1 to “Split 2 Wide.” Set the multi panel name to “Monitor1.”

SMultiPattern,1,Wide2,'Monitor1'

Description

- This command is only valid for the GX20/GP20.

SMultiKind

Multi Panel [GX/GP]

Set the screens to display on the multi panel.

Syntax SMultiKind,p1,p2,p3,p4

p1 Registration number (1 to 20)

p2 Screen position (1 to 6)

p3 Screen type

Trend	Trend
Digital	Digital
Bar	Bar graph
Overview	OVERVIEW
Alarm	Alarm summary
Message	Message summary
Memory	Memory summary
Report	Report summary
Modbus-M	Modbus master status
Mosbus-C	Modbus client status
Watt	WT communication status
Switch	Internal switch status
Action-Log	Event log
Error-Log	Error log
Commu-Log	Communication log
Ftp-Log	FTP log
Web-Log	Web log
Mail-Log	Mail log

	`Modbus-Log`	Modbus log
	`Sntp-Log`	SNTP log
	`Dhcp-Log`	DHCP log
	`Network`	Network information
`P4`	Display group number	

Query `SMultiKind[,p1[,p2]]?`

Example Display the bar graph of display group 8 in screen position 3 of the registration number 1 panel.

```
SMultiKind,1,3,Bar,8
```

Description

- This command is only valid for the GX20/GP20.
- Report is an option (/MT).
- Modbus-M and Modbus-C are an option (/MC).
- Watt is an option (/E2).
- Custom display screen (/CG) cannot be shown in a multi panel.

SHomeMonitor

Standard Screen Information [GX/GP]

Sets the standard screen display information.

Syntax `SHomeMonitor,p1,p2`

`p1` Information type (see the table of the **SMonitor** command)

`p2` Status (see the table of the **SMonitor** command)

Query `SHomeMonitor[,p1]?`

Example Set the trend display to all-channel display.

```
SHomeMonitor,Trend,All
```

SHomeKind

Standard Screen [GX/GP]

Set the standard screen.

Syntax `SHomeKind,p1,p2`

`p1` Screen type

`Trend`	Trend
`Digital`	Digital
`Bar`	Bar graph
`Overview`	OVERVIEW
`Alarm`	Alarm summary
`Message`	Message summary
`Memory`	Memory summary
`Report`	Report summary
`Modbus-M`	Modbus master status
`Mosbus-C`	Modbus client status
`Watt`	WT communication status
`Switch`	Internal switch status
`Action-Log`	Event log
`Error-Log`	Error log
`Commu-Log`	Communication log
`Ftp-Log`	FTP log
`Web-Log`	Web log
`Mail-Log`	Mail log
`Modbus-Log`	Modbus log
`Sntp-Log`	SNTP log
`Dhcp-Log`	DHCP log
`Network`	Network information
`Setting`	Settings
`SaveLoad`	Save load
`SystemInfo`	System information
`Multi`	Multi panel
`Custom Display`	Customized display screen

`p2` Display group number
Multi panel registration number (1 to 20) when p1=Multi
Custom display number (1 to 30) when p1 = CustomDisplay

Query `SHomeKind?`

Example Set the standard screen to trend of display group 1.

```
SHomeKind,Trend,1
```

Description

- Report is an option (/MT).
- Modbus-M and Modbus-C are an option (/MC).
- Watt is an option (/E2).
- CustomDisplay is an option (/CG).
- Multi is a GX20/GP20 display.

SFavoriteMonitor

Favorite Screen Display Information [GX/GP]

Sets the favorite screen display information.

Syntax `SFavoriteMonitor,p1,p2,p3`

`p1` Favorites number (1 to 20)

`p2` Information type (see the table of the **SMonitor** command)

`p3` Status (see the table of the **SMonitor** command)

Query `SFavoriteMonitor[,p1[,p2]]?`

Example Set the trend display to all-channel display.

```
SFavoriteMonitor,1,Trend,All
```

SFavoriteKind

Favorite Screen [GX/GP]

Set the favorite screen.

Syntax `SFavoriteKind,p1,p2`

`p1` Favorites number (1 to 20)

`p2` Enable or disable (Off, On)

`p3` Screen type (see p1 of the **SHomeKind** command)

`P4` Display group number (multi panel registration number if p3=Multi, custom display number if p3 = CustomDisplay)

`p5` Favorite screen name (up to 16 characters, UTF-8)

Query `SFavoriteKind[,p1]`
Example Register the trend display of display group 2 to favorites screen number 1. Set the screen name to “Favorite01.”
```
SFavoriteKind,1,On,Trend,2,'Favorite01'
```

SBluetooth

Bluetooth communication function (/C8) [GM]

Sets the Bluetooth communication function.

Syntax `SBluetooth,p1`
`p1` Bluetooth function On/Off (On, Off)

`On`	Use
`Off`	Not Use

Query `SBluetooth?`
Example Use the Bluetooth communication function.
```
SBluetooth,On
```

Description

- The settings specified with this command take effect with the **OBTApply** command. The settings do not change until you send the OBTApply command.

SBTID

Bluetooth communication ID (/C8) [GM]

Sets the Bluetooth communication ID.

Syntax `SBTID,p1`
`p1` Local device name (GM’s Bluetooth device name)
Up to 30 characters, ASCII

Query `SBTID?`
Example Set the local device name to “SMARTDAC+ GM.”
```
SBTID,'SMARTDAC+ GM'
```

SBTTimeOut

Bluetooth communication timeout (/C8) [GM]

Sets the Bluetooth communication timeout.

Syntax `SBTTimeOut,p1`
`p1` Timeout function (Off, 1min, 2min, 5min, 10min)

Query `SBTTimeOut?`
Example Set the Bluetooth communication timeout value to 5 minutes.
```
SBTTimeOut,5min
```

Description

- If the login function is in use, users that are logged in are automatically logged out when a timeout occurs.

SUsbFunction

USB Communication Function [GM]

Configures USB communication function settings.

Syntax `SUsbFunction,p1`

`p1` USB communication function On/Off (On, Off)

`On`	Use
`Off`	Not Use

Query `SUsbFunction?`

Example Use the USB communication function.

```
SUsbFunction,On
```

Description

- The settings specified with this command take effect with the **OUsbFApply** command. The settings do not change until you send the OUsbFApply command.

SUsbAutoLOut

USB Communication Auto Logout [GM]

Sets the auto logout for USB communication.

Syntax `SUsbAutoLOut,p1`

`p1` Auto logout function (Off, 1 min, 2 min, 5 min, 10 min)

Query `SUsbAutoLOut?`

Example Set the USB communication's auto logout time to 2 minutes.

```
SUsbAutoLOut,2min
```

Description

- Users logged in via USB communication can be automatically logged out.

2.5 Output Commands

FData

Outputs the Most Recent Channel Data

Outputs the most recent I/O channel, math channel, and communication channel data.

Syntax `FData,p1,p2,p3`

`p1` Output format

- `0` The most recent data in ASCII format
- `1` The most recent data in binary format

`p2` First channel

`p3` Last channel

Example Output the most recent data of channels 0001 to 0020 in ASCII format.

```
FData,0,0001,0020
```

Description

- If you omit p2 and p3, all channels will be output.
- Channel ranges whose first channel and end channel are different channel types are interpreted as follows:

First Channel	Last Channel	Setting
0001	A100	0001 to 9999, A001 to A100
A001	C500	A001 to A100, C001 to C500
C001	A100	Not allowed (will result in error)
A001	0001	Not allowed (will result in error)

- For the ASCII output format, see **page 2-73**.
- For the binary output format, see **page 2-108**.

FRelay

Outputs the Most Recent Relay and Internal Switch Status

Outputs the most recent relay (DO Channel) and internal switch status.

Syntax `FRelay,p1`

`p1` Output information

- `0` The most recent relay (DO channel) status in ASCII format
- `1` The most recent internal switch status in ASCII format

Example Output the relay (DO channel) status.

```
FRelay,0
```

Description

- For the output format, see **page 2-74** or **page 2-76**.

FFifoCur

Outputs Channel FIFO Data

Outputs the I/O channel, math channel, and communication channel FIFO data.

Acquire the FIFO Data

Syntax `FFifoCur,p1,p2,p3,p4,p5,p6,p7`

`p1` FIFO data output (0)

p2 Scan group (1)
p3 First channel
P4 Last channel
p5 Read start position (-1, 0 to 99999999999)
-1 The most recent read position
p6 Read end position (-1, 0 to 99999999999)
-1 The most recent read position
p7 Maximum number of blocks to read (1 to 9999)

Example Read the measured data of channels 0001 to 0020. Set the read start position to 180 and the read end position to the most recent position. Set the maximum number of blocks to read to 9999.
```
FFifoCur,0,1,0001,0020,180,-1,9999
```

Acquire the FIFO Data Read Range

Syntax
```
FFifoCur,p1,p2
```
p1 FIFO read range output (1)
p2 Scan group (1)

Example Acquire the current readable range.
```
FFifoCur,1,1
```

Description

- For the binary output format, see page 2-111.

FSnap

Snapshot [GX/GP]

Outputs a snapshot data (screen image data) file.

Syntax
```
FSnap,p1
```
p1 Screen image data output (GET)

Example Acquire screen image data.
```
FSnap,GET
```

Description

- A PNG image file will be stored in the data block of the binary output file (see page 2-71).

FUser

Outputs the User Level

Outputs information about the users who are currently logged in.

Syntax
```
FUser,p1
```
p1 Information about the users who are currently logged in
0 Refer to your own user information.
1 Refer to information about all users who are currently logged in.

Example Refer to information about all users who are currently logged in.
```
FUser,1
```

Description

- For the ASCII output format, see page 2-77.

FAddr

Outputs the IP Address

Outputs the recorder IP address information.

Syntax
```
FAddr,p1
```
p1 Address output (IP)
Output address information that includes the IP address, subnet mask, default gateway, and DNS server as well as the host name and domain name.

Example Output the recorder IP address information.
```
FAddr,IP
```

Description

- For the ASCII output format, see page 2-79.

FStat

Outputs the recorder Status

Outputs the recorder status.

Syntax
```
FStat,p1
```
p1 Status output (0)

Example Output the recorder status.
```
FStat,0
```

Description

- For the ASCII output format, see page 2-80.

FLog

Outputs the Log

Outputs the alarm summary, message summary, error log, etc.

Syntax
```
FLog,p1,p2
```
p1 Status output (0)
ALARM Alarm summary
MSG Message summary
EVENT Event log
ERROR Error log
DHCP Ethernet address setting log
GENERAL General communication log
MODBUS Modbus log
FTP FTP client log
SNTP SNTP client log
MAIL E-mail log
WEB Web log
p2 Maximum log readout length

p1	Read range
ALARM	1 to 1000
MSG	1 to 500
GENERAL	1 to 200
MODBUS	1 to 50 (1 to 200 for the GX20-2/GP20-2)
Other than those above.	1 to 50

Example Output 600 alarm summary entries.
```
FLog,ALARM,600
```

Description

- For the ASCII output format, see page 2-82.

FEventLog

Outputs a Detail Event Log(/AS)

Outputs an event log. You can specify the event, user, etc.

Syntax `FEventLog,p1,p2,p3,p4`

`p1` Output format
- 0 The same output format as Flog, EVENT (no detailed information).
- 1 Include detailed information

`p2` User name

Up to five user names can be specified by separating each user with a colon.

`p3` Event specification (specified with an event string)

Up to five events can be specified by separating each user with a colon. Events will be searched using a prefix search.

`P4` Maximum number of output (1 to 400)

Example Output the log of up to 10 “message001” writing operations by User01.

```
FEventLog,1,User01,Message001,10
```

Description

- Omitting p2 is equivalent to specifying all users.
- If more than five users are specified by p2, only the first five users will be valid.
- Omitting p3 is equivalent to specifying all events.
- If more than five events are specified by p3, only the first five events will be valid.
- For the event strings of p3, see section **2.10.19 Detail Event Log Output (FEventLog) (/AS)**.”

FMedia

Outputs External Storage Medium and Internal Memory Information

Outputs external storage medium and internal memory information.

File list

Syntax `FMedia,p1,p2,p3,p4`

`p1` Output type (DIR)

`p2` Path name (up to 100 characters)

Path name for outputting the file list

`p3` File list output start position (1 to 99999999)

`P4` File list output end position (1 to 99999999, -1)

Last position for outputting the file list. If you specify -1, the maximum possible number of files (as large as the recorder internal communication buffer allows) will be output.

Example Output all the file lists in the DRV0 directory.

```
FMedia,DIR,/DRV0/
```

Output the file lists of items 10 to 20 in the DRV0 directory.

```
FMedia,DIR,/DRV0/,10,20
```

Description

- Path names (p2) for the internal memory and the external media are listed below. Set the path name using a full path.
  Internal memory: /MEMO/DATA/
  SD memory card: /DRV0/
  USB flash memory: /USB0/
- If you omit p3 and p4, the maximum possible number of files (as many as the GX internal communication buffer allows) will be output.
- For the ASCII output format, see **page 2-98**.

Data in Files

Syntax `FMedia,p1,p2,p3,p4`

`p1` Output type (GET)

`p2` Path name (up to 100 characters)

Path name of the file for outputting data

`p3` Data output start position (in bytes) (0 to 2147483647)

`P4` Data output end position (in bytes) (0 to 2147483647, -1)

The last data output position. If you specify -1, the maximum file size (as large as the recorder internal communication buffer allows) will be output.

Example Output all the data in file xyz in the DRV0/DATA0 directory.

```
FMedia,GET,/DRV0/DATA0/xyz
```

Description

- If you omit p3 and p4, the maximum file size (as large as the recorder internal communication buffer allows) will be output.
- The file data will be stored in the data block of the binary output file (see **page 2-71**).

Free Space on the External Storage Medium

Syntax `FMedia,p1`

`p1` Output type (CHKDSK)

Example Output the free space on the external storage medium.

```
FMedia,CHKDSK
```

Description

- For the ASCII output format, see **page 2-98**.

FCnf

Outputs Setting Data

Outputs the recorder setting data.

Syntax `FCnf,p1`

`p1` Operation

`ALL`	Read all settings.
`IO`	Read I/O settings.
`MATH`	Read Math settings.
`COMM`	Read communication settings.
`GROUP`	Read display group settings.
`IP`	Read IP address settings.
`SECURITY`	Read security settings.
`OTHERS`	Read settings other than above.

You can specify multiple items in the list above. Separate each item with a colon (see the example).

Example Read I/O and Math settings.
```
FCnf,IO:MATH
```

Description

- If you omit p1, all settings will be read.
- The setting data is output as the responses to the command queries. The following table lists p1 and the corresponding commands.

p1	Command
IO	SModeAI, SModeDI, SScaleOver, SRangeAI, SRangeDI, SRangeDO, SMoveAve, SBurnOut, SRjc, SAlarmIO, SAlmHysIO, SAlmDlyIO, STagIO, SColorIO, SZoneIO, SScaleIO, SBarIO, SPartialIO, SBandIO, SAlmMarkIO, SValueIO, SCalibIO
MATH	SMathBasic, SKConst, SWconst, SRangeMath, STlogMath, SRolAveMath, SAlarmMath, SAlmHysMath, SAlmDlyMath, STagMath, SColorMath, SZoneMath, SScaleMath, SBarMath, SPartialMath, SBandMath, SAlmMarkMath, SReport, SRepData, SRepTemp, SRepCh, SDigitalSign
COMM	SRangeCom, SValueCom, SWDCom, SAlarmCom, SAlmHysCom, SAlmDlyCom, STagCom, SColorCom, SZoneCom, SScaleCom, SBarCom, SPartialCom, SBandCom, SAlmMarkCom
GROUP	SGroup, STripLine, SSclBmp
IP	SIpAddress, SDns, SDhcp
SECURITY	SSecurity, SOpePass, SOpeLimit, SUser, SUserLimit

- For the output format, see page 2-99.

FChInfo

Outputs Decimal Place and Unit Information

Outputs decimal place and unit information.

Syntax `FChInfo,p1,p2`
`p1` First channel
`p2` Last channel

Example Output the decimal place and unit information of channels 0001 to 0003.
```
FChInfo,0001,0003
```

Description

- If you omit p1 and p2, all channels will be output.
- For the output format, see page 2-99.

FSysConf

Queries the System Configuration and Reconfigures Modules

Queries the System Configuration, Reconfigures Modules, and Performs Activation.

Query the System Configuration

Syntax `FSysConf`

Example Query the System Configuration.
```
FSysConf
```

Description

- For the output format, see page 2-100.

Reconfigures Modules

Aligns the module configuration settings that are recognized by the recorder and the actual module configuration.

Syntax `FSysConf,p1`
`p1` Module reconfiguration (1)

Example Reconfigure the modules.
```
FSysConf,1
```

Activate module

Modules need to be activated when the firmware in installed modules is updated or when modules are recalibrated.

Syntax `FSysConf,p1`
`p1` Activate module (3)

Example Activate modules.
```
FSysConf,3
```

Description

- When the advanced security function (/AS) is disabled, this commands will result in error.

FBTDevInfo

Bluetooth Device Information Output [GM]

Outputs the Bluetooth device information of the recorder.

Syntax `FBTDevInfo,p1`
`p1` Bluetooth device information output (0)

Example Output the Bluetooth device information of the connected device.
```
FBTDevInfo,0
```

Description

- p1 can be omitted.
- For the output format, see page 2-102.

2.6 Operation Commands

OSetTime

Sets the Time

Sets the time.

Syntax `OSetTime,p1`

`p1` Time to set
"YYYY/MO/DD_HH:MI:SS" (the underscore denote a space), "YYYY/MO/DD", or "HH:MI:SS."

`YYYY`	Year (2001 to 2035)
`MO`	Month (01 to 12)
`DD`	Day (01 to 31)
`HH`	Hour (00 to 23)
`MI`	Minute (00 to 59)
`SS`	Second (00 to 59)

Query `OSetTime?`
The OSetTime query outputs the recorder current time.

Example Set the time to 23:00:00 on May 24, 2013.
`OSetTime,2013/05/24 23:00:00`

ORec

Starts or Stops Recording

Starts or stops recording.

Syntax `ORec,p1`

`p1` Recording start or stop

`0`	Start
`1`	Stop

Query `ORec?`

Example Start recording.
`ORec,0`

OAlarmAck

Clears Alarm Output

Clears alarm output (performs an alarm ACK).

Syntax `OAlarmAck,p1`

`p1` Alarm output clearance (0)

Example Clear the alarm output.
`OAlarmAck,0`

Individual alarm ACK

Syntax `OAlarmAck,p1,p2,p3`

`p1` Individual alarm output clearance (1)

`p2` Channel number

`p3` Alarm level (1 to 4)

Example Clear the alarm output of alarm 3 of channel 0001.
`OAlarmAck,1,0001,3`

Description

- If you send an individual alarm ACK command when the individual alarm ACK function is not in use, no action is taken, and a normal response is returned.

OExecRec

Generates a Manual Trigger, Executes Manual Sample, Takes a Snapshot, or Causes a Timeout

Generates a manual trigger, executes manual sample, takes a snapshot, or divides the data being recorded into separate files.

Syntax `OExecRec,p1`

`p1` Action type
(GX/GP: 0, 1, 2, 3, 4)
(GM: 0, 1, 3, 4)

`0`	Execute manual sampling.
`1`	Generate a manual trigger.
`2`	Take a snapshot.
`3`	Cause a display data timeout (divide files).
`4`	Cause an event data timeout (divide files).

Example Execute manual sampling.
`OExecRec,0`

Description

- Manual trigger (p1 = 1) cannot be executed when the advanced security function (/AS) is enabled.
- If a manual sample is executed (p1 = 0) when there are no source channels for manual sampling, a file without any source channels will be created.

OExecSNTP

Queries the Time Using SNTP

Queries the time using SNTP.

Syntax `OExecSNTP,p1`

`p1` Time query execution (0)

Example Query the time using SNTP.
`OExecSNTP,0`

OMessage

Message Writing

Writes a message.

Write a Preset Message

Syntax `OMessage,p1,p2,p3`

`p1` Action type (PRESET)

`p2` Message number (1 to 100)

`p3` Display group number

`ALL`	Write to all display groups
`1` to `60`	Write to specified groups

You can specify multiple groups at once. To do so, separate display groups with a colon.

Example Write the message in preset message number 8 to display groups 1 and 2.

```
OMessage,PRESET,8,1:2
```

Write a Free Message

Syntax `OMessage,p1,p2,p3,p4`

`p1` Action type (FREE)

`p2` Message number (1 to 10)

`p3` Display group number

`ALL` Write to all display groups

`1` to `60` Write to specified groups

You can specify multiple groups at once. To do so, separate display groups with a colon.

`P4` Message string to write (up to 32 characters, UTF-8)

Example Write a free message “MARK” as message number 2 in display groups 3, 8, and 11.

```
OMessage,FREE,2,3:8:11,'MARK'
```

OPassword

Changes the Password

Changes the password.

Syntax `OPassword,p1,p2,p3`

`p1` Old password (up to 20 characters, ASCII)

`p2` New password (up to 20 characters, ASCII)

`p3` New password (enter the same password as p2)

Example Change the password from “PASS001” to “WORD005.”

```
OPassword,'PASS001','WORD005','WORD005'
```

Description

- For the characters that you can use for the password, see **Appendix 1**.

OMath

Starts, Stops, or Resets Computation or Clears the Computation Dropout Status Display

Starts or stops computation, resets computed values, or clears the computation dropout status display.

Syntax `OMath,p1`

`p1` Action type (0)

`0` Start computation

`1` Stop computation

`2` Reset computation

`3` Clear the computation dropout status display

Query `OMath?`

Example Start computation.

```
OMath,0
```

Description

- You cannot use this command while the recorder is saving or loading setup data.

OSaveConf

Saves Setting Data

Saves the recorder setting data to the recorder’s external storage medium.

Syntax `OSaveConf,p1,p2,p3`

`p1` File name (up to 80 characters, ASCII)

Specify the path and file name, excluding the extension.

`p2` Medium

(GX/GP: SD, USB)

(GM: SD)

`SD` SD memory card

`USB` USB flash memory

`p3` Setting file comment (up to 50 characters, UTF-8)

Example Save setting data to a file named “SETFILE1” to the SD memory card.

```
OSaveConf,'SETFILE1',SD
```

Description

- If you omit p3, the default setting file comment will be added. You can edit the default setting file comment from the recorder front panel.

OSaveConfAll

Saves setting data at once [GM]

Saves the GM setting data to the specified folder in the external storage medium.

Syntax `OSaveConfAll,p1,p2`

`p1` Folder name (up to 80 characters, ASCII)

Specify the folder name as “path name+folder name.”

`p2` Medium (SD)

`SD` SD card

Example Save the setting data collectively to the “CONFIG0” folder.

```
OSaveConfAll,'CONFIG0',SD
```

Description

- If you omit parameter p2, the medium is set to the SD card.
- The following items are saved. File names are indicated in parentheses.
  - Setting data file (Config.GNL or Config.GSL)
  - Report template (Report_YY.xlsx, Report_YY.xlsm, or Report_YY.tpl)
    YY is the report type.
  - Trusted certificate
    A “Client” folder is created in the specified folder (p1), and the data is saved there.
  - Server certificate
    A “Server” folder is created in the specified folder (p1), and the data is saved there.

OCommCh

Sets a Communication Channel to a value

Sets a communication channel to a value.

Syntax `OCommCh,p1,p2`
- `p1` Communication channel
- `p2` Value
  The setting range is as follows:
  –9.9999999E+29 to –1.0000000E–30, 0,
  1.0000000E-30 to 9.9999999E+29
  The number of significant digits is 8.

Query `OCommCh[,p1]?`

Example Set communication channel C001 to 2.5350.
`OCommCh,C001,2.5350`

OEMail

Starts or Stops the E-mail Transmission Function

Starts or stops the e-mail transmission function.

Syntax `OEMail,p1`
- `p1` Action type
  - `0` Start the e-mail transmission function.
  - `1` Stop the e-mail transmission function.

Example Start the e-mail transmission function.
`OEMail,0`

OMBRestore

Recovers Modbus manually

Resumes command transmission from Modbus client or Modbus master to devices in which communication errors have occurred.

Syntax `OMBRestore,p1`
- `p1` Action type
  - `0` Modbus client (Ethernet)
  - `1` Modbus master (serial)

Example Manually recover the Modbus client.
`OMBRestore,0`

ORTReset

Resets a Relative Timer

Resets a relative timer.

Syntax `ORTReset,p1`
- `p1` Timer type
  - `0` All timers
  - `1` to `4` Timer number

Example Reset relative timer 2.
`ORTReset,2`

OMTReset

Resets the Match Time Timer

Resets the match time timer

Syntax `OMTReset,p1`
- `p1` Timer type
  - `0` All timers
  - `1` to `4` Timer number

Example Reset match time timer 2.
`OMTReset,2`

OCmdRelay

Outputs the DO Channel and Internal Switch Status

Outputs the DO channel and internal switch status.

Syntax `OCmdRelay,p1`
- `p1` Specification of a setting
  - Express the setting. Set a channel status as follows: [channel number]-[status]. Use a hyphen as a separator.
  - You can specify the following values for the channel number.
    DO channel number
    Internal switch number
  - You can specify the following values for the status.
    Off: Off status
    On: On status
  - You can specify the status of multiple channels at once. To do so, use a semicolon to separate channels as follows: [channel number]-[status]:[channel number]-[status]:. . . You can specify up to a total of 32 channels that consist of DO channels and internal switches.

Example Set channels 0101, 0102, and 0103 to On and internal switches S001 and S002 to Off.
`OCmdRelay,0101-On:0102-On:0103-On:S001-Off:S002-Off`

Description
- If any of the channels that you specify do not exist or are not set to manual output (**SRangeDO** command), the settings of all channels are canceled, and a command error results.

OBatName

Sets a Batch Name

Sets a batch name.

Syntax `OBatName,p1`
- `p1` Always set this to 1.
- `p2` Batch number (up to 32 characters, ASCII)
- `p3` Lot number (0 to 99999999, up to eight digits, depending on Lot-No. digit)

Query `OBatName?`

Example Set the batch name structure to batch number "PRESSLINE" and the lot number 007.
```
OBatName,1,'PRESSLINE',007
```

Description

- For the characters that you can use in the specified batch number (p2), see **Appendix 1**.
- The character limitations on the batch number (p2) are the same as those for directory names. See the explanation for the **SDirectory** command.

OBatComment

Sets a Batch Comment

Sets a batch comment.

Syntax `OBatComment,p1,p2,p3`
- `p1` Always set this to 1.
- `p2` Comment number (1 to 3)
- `p3` Comment string (up to 50 characters, UTF-8)

Query `OBatComment?`

Example Set comment number 2 to "THIS PRODUCT IS COMPLETED."
```
OBatComment,1,2,'THIS PRODUCT IS COMPLETED'
```

OBatText

Sets a Batch Text

Sets a batch text.

Syntax `OBatText,p1,p2,p3,p4`
- `p1` Always set this to 1.
- `p2` Field number (1 to 24)
- `p3` Field title (up to 20 characters, UTF-8)
- `P4` Field string (up to 30 characters, UTF-8)

Query `OBatText?`

Example For field number 1, set the title to "Ope" and the character string to "GX."
```
OBatText,1,'Ope','GX'
```

ODispRate

Switches the Trend Interval [GX/GP]

Switches between first trend interval (normal trend interval) and second trend interval.

Syntax `ODispRate,p1`
- `p1` Trend interval
  - `NORMAL` First trend interval (normal trend interval)
  - `SECOND` Second trend interval

Example Switch from first trend interval to second trend interval.
```
ODispRate,SECOND
```

Description

- Set the second trend interval with the **STrdRate** command.

OLoadConf

Loads Setting Data

Loads a setting data file from the recorder external storage medium into the recorder.

Syntax `OLoadConf,p1,p2,p3`
- `p1` File name (up to 80 characters, ASCII)
  Specify the path and file name, excluding the extension.
- `p2` Medium
  (GX/GP: SD, USB)
  (GM: SD)
  - `SD` SD memory card
  - `USB` USB flash memory
- `p3` Settings to load
  - `ALL` All settings
  - `SECURITY` Security settings only
  - `IP` IP address settings only
  - `OTHERS` All settings except for security and IP address settings

  Multiple options can be selected for p3. To do so, separate items with a colon.

Example Load all settings from the setting file "SETTING1" on the SD memory card.
```
OLoadConf,'SETTING1',SD,ALL
```
Load security and IP address settings from a setting file named "SETTING1" from the SD memory card.
```
OLoadConf,SETTING1,SD,SECURITY:IP
```

Description

- If you omit parameter p2, the medium is set to the SD memory card.
- If you omit parameter p3, all settings will be loaded.
- If you change the language with this command, the recorder may restart.

OLoadConfAll

Loads Setting Data at Once [GM]

Loads all settings into the GM from the specified folder of the GM's external storage medium.

Syntax `OLoadConfAll,p1,p2`
- `p1` Folder name (up to 80 characters)
  Specify the folder name as "path name+folder name."
- `p2` Medium (SD)
  - `SD` SD card

Example Load all settings from the "CONFIG0" folder of the SD card.
```
OLoadConfAll,'CONFIG0',SD
```

Description

- The following items are loaded into the GM. File names are indicated in parentheses.
  - Setting data file (Config.GNL or Config.GSL)
  - Report template (Report_YY.xlsx, Report_YY.xlsm, or Report_YY.tpl)
    YY is the report type.

- Trusted certificate
  The certificate file in the “Client” folder in the specified folder (p1) is loaded.

OSeriApply

Applies Serial Communication Settings

Applies serial communication settings.

Syntax `OSeriApply,p1`
`p1` Apply the settings (0).

Example Apply serial communication settings.
`OSeriApply,0`

Description

- This command applies the serial communication settings specified by the **SSerialBasic** command.
- When you send this command, the serial communication settings take effect when the recorder returns a response. After this process, the connection will be cut off.

OIPApply

Applies the IP Address

Applies Ethernet communication settings.

Syntax `OIPApply,p1`
`p1` Apply the settings (0).

Example Apply the IP address settings.
`OIPApply,0`

Description

- This command applies the IP address settings specified by the **SIpAddress**, **SDhcp**, **SDns**, and **SServer** commands.
- When you send this command, the IP address settings take effect when the recorder returns a response. After this process, the connection will be cut off. This includes Ethernet connections to other devices (Modbus server, FTP server, etc.).

OInit

Clears Measured Data and Initializes Setting Data

Clears the measured data in internal memory. The command also initializes setting data.

Syntax `OInit,p1`
`p1` The types of data to be initialized and cleared

`SECURITY`	Security settings
`Memory`	Display data, event data, manual sampled data, report data, alarm summary, message summary
`OTHERS`	Settings other than those above
`ALL`	All measured data and settings

You can specify multiple items at once. To do so, separate items with a colon.

Example Delete the measured data and summary from the internal memory.
`OInit,MEMORY`

Description

- IP address settings are those set with the **SIpAddress, SDns, SDhcp**, and SDhcp commands

OUsbFApply

Applies USB communication settings [GM]

Applies USB communication settings.

Syntax `OUsbFApply,p1`
`p1` Apply the settings

Example Apply the USB communication On/Off setting specified with the SUsbFunction command.
`OUsbFApply,0`

OBTApply

Applies Bluetooth Communication Settings (/C8) [GM]

Applies Bluetooth communication settings.

Syntax `OBTApply,p1`
`p1` Apply the settings (0)

Example Apply the Bluetooth communication On/Off setting specified with the SBluetooth command.
`OBTApply,On`

OBTClearList

Clears the Bluetooth Connection List (/C8) [GM]

Clears the Bluetooth connection list.

Syntax `OBTClearList`
(No parameters)

Example Clear the connected Bluetooth connection list.
`OBTClearList`

OLoginAssist

Assists Login [GX/GP]

Assists logging in to the recorder, during bar-code input.

Syntax `OLoginAssist,p1,p2,p3`
`p1` Input type (1, 2)
1 User name input
2 User name and user ID input
`p2` User name
`p3` User ID

Example Log in with the user name “User01.”
`OLoginAssist,1,'User01'`

Description

- When this command is executed, the recorder shows the login screen and waits for a user password and user ID input.
- p1 = 2 is valid when the advanced security function (/AS) is enabled.
- p3 is valid when p1 = 2. However, when the user ID is not used, p3 is invalid.
- This command is valid when the serial communication function (the **SSerialBasic** command) is set to Barcode or the USB input device (the **SUsbInput** command) is set to Barcode.

OSendValue

Assists Touch Panel Operation Input [GX/GP]

Assists text input during touch panel operation.

Syntax `OSendValue,p1,p2`

`p1` Fixed to 0.

`p2` Character string (up to 64 characters, UTF-8)

Example On the message settings screen, enter the message “START” (display the message settings screen and select the text box for entering the message string in advance).

```
OSendValue,0,'START'
```

Description

- Input into a text area that displays asterisks (*****) is not possible.
- This command is valid when the serial communication function (the **SSerialBasic** command) is set to Barcode or the USB input device (the **SUsbInput** command) is set to Barcode.

OUserLockACK

User Locked ACK (/AS)

Clears the user locked display.

Syntax `OUserLockACK`

Example Clears the user locked display.

```
OUserLockACK
```

Description

- This command can be executed only when the user is logged in as an administrator.
- If there are no locked users, nothing will take place.

OKeyLock

Key Lock On/Off [GM]

Turns key lock on or off.

Syntax `OKeyLock,p1`

`p1` Key lock on/off (On, Off)

`On` Locks the keys

`Off` Releases the key lock

Example Release the key lock.

```
OKeyLock,Off
```

Description

- Turning the key lock on will lock the START, STOP, USER1, and USER2 keys. You cannot lock the key individually.
- Only administrator level users can turn key lock on and off.

OErrorClear

Clears the Error Display [GM]

Clears the error display status from the 7 segment LED.

Syntax `OErrorClear,p1`

`p1` Error display clear type

`0` Error display clear

Example Clear the error display status from the 7 segment LED.

```
OErrorClear,0
```

2.7 Communication Control Commands

CCheckSum

Sets the Checksum

Sets the presence or absence of checksum.

Syntax `CCheckSum,p1`

`p1` Checksum usage

0 Do not compute

1 Compute

Query

Example Enable the checksum.

```
CCheckSum,1
```

CSFilter

Sets the Status Filter

Sets the filter used when outputting the recorder status.

Syntax `CSFilter,p1`

`p1` Filter values for status information numbers 1 to 4 (0.0.0.0 to 255.255.255.255)

Query `CSFilter?`

Example Set the status filter value to 255.127.63.31.

```
CSFilter,255.127.63.31
```

Description

- The status filter is applied to each communication connection.

CLogin

Log in over a Communication Path

Logs in over a communication path.

Syntax `CLogin,p1,p2`

`p1` User name

`p2` password

Example Log in using the user name “admin” and password “password.”

```
CLogin,admin,password
```

Description

- For the characters that you can use for the password, see **Appendix 1**.

When Using the Advanced Security Function (/AS)

Syntax `CLogin,p1,p2,p3,p4,p5`

`p1` User name

`p2` User ID

`p3` Password

`p4` The new password when the password has expired

`p5` The new password when the password has expired for confirmation

Example Log in using the user name “admin01” and password “password01.”

```
CLogin,admin01,,password01
```

Description

- If p4 and p5 are not specified, normal login will be used.
- Even if the password has not expired, you can enter a new password in p4 in p5 to change the password and log in.
- If p4 and p5 are not the same, an error will occur.
- You cannot change to the same password (if p3 is the same as p4 and p5, an error will occur).
- If the user ID is not used, p2 is invalid.
- When using the password management, you cannot specify p4 and p5.
- For the characters that you can use for the password, see **Appendix 1**.

CLogout

Log Out over a Communication Path

Logs out over a communication path.

Syntax `CLogout`

Example Logs out from the recorder.

```
CLogout
```

CBTConnect

Starts Bluetooth Communication (/C8) [GM]

Starts Bluetooth communication.

Syntax `CBTConnect,p1`

`p1` Bluetooth password of the device you want to connect to

Example Connect to the device whose Bluetooth password is “PaSswoRD2.”

```
CBTConnect,'PaSswoRD2'
```

Description

- This command is valid only when a Bluetooth password request has been received via Bluetooth communication. If the command is invalid, error 352, “Unknown command,” will occur.

ESC O

Opens an Instrument : RS-422/485 command

Starts communication with the recorder. ESC in ASCII code is 0x1B. For details, see **Appendix 1**.

Syntax `ESC O p1`
`p1` Instrument address (01 to 99)

Example Open the instrument at address 99.
`ESC O 99`

Description

- Specify the address of the instrument that you want to communicate with.
- You can only open one instrument at any given time.
- Use a capital “O.”
- For this command, use CR+LF for the terminator.
- For the responses to this command, see **page 2-72**.

ESC C

Closes an Instrument : RS-422/485 command

Ends communication with the recorder. ESC in ASCII code is 0x1B. For details, see **Appendix 1**.

Syntax `ESC C p1`
`p1` Instrument address (01 to 99)

Example Close the instrument at address 77.
`ESC C 77`

Description

- This command closes the connection to the instrument you are communicating with.
- Use a capital “C.”
- For this command, use CR+LF for the terminator.
- For the responses to this command, see **page 2-72**.

2.8 Instrument Information Output Commands

_MFG

Outputs the Instrument Manufacturer

Outputs the instrument manufacturer.

Syntax `_MFG`

Description

- For the ASCII output format, see **page 2-102**.

_INF

Outputs the Instrument's Product Name

Outputs the instrument's product name.

Syntax `_INF`

Description

- For the ASCII output format, see **page 2-102**.

_COD

Outputs the Instrument's Basic Specifications

Outputs the instrument's basic specifications.

Syntax `_COD`

Description

- For the ASCII output format, see **page 2-103**.

_VER

Outputs the Instrument's Firmware Version Information

Outputs the instrument's firmware version information.

Syntax `_VER`

Description

- For the ASCII output format, see **page 2-103**.

_OPT

Outputs the Instrument's Option Installation Information

Outputs the instrument's option installation information.

Syntax `_OPT`

Description

- For the ASCII output format, see **page 2-104**.

_TYP

Outputs the Instrument's Temperature Unit and Daylight Saving Time Installation Information

Outputs whether the instrument's Fahrenheit temperature unit and daylight saving time setting is enabled or disabled.

Syntax `_TYP`

Description

- For the ASCII output format, see **page 2-104**.

_ERR

Outputs the Instrument's Error Number Information

Outputs the error description that corresponds to the error number.

Syntax `_ERR,p1,p2,...`
Write the details of the negative response returned from the recorder in p1, p2, etc.

Example Output the error description when negative response `"E1,10:1:2,500:2:5"` is returned.

```
_ERR,10:1:2,500:2:5
```

Description

- For the ASCII output format, see **page 2-105**.

_UNS or _UNR

Outputs the Instrument's Unit Configuration Information

Outputs the instrument's unit configuration information.

Syntax

`_UNS`	Outputs the status that is recognized by the device.
`_UNR`	Outputs the installation status.

Description

- For the ASCII output format, see **page 2-105**.

_MDS or _MDR)

Outputs the Instrument's Module Configuration Information

Outputs the instrument's module configuration information.

Syntax

`_MDS`	Outputs the status that is recognized by the device.
`_MDR`	Outputs the installation status.

Description

- For the ASCII output format, see **page 2-106**.

2.9 Responses to Commands

This section explains the responses that recorder returns in response to commands. There are three types of responses: affirmative response, negative response, and data output response.

2.9.1 Affirmative Response (For commands other than output request commands)

If the recorder successfully completes the processing of a received command that is not an output request command, it returns an affirmative response.

Syntax

E0*CRLF*

"*CRLF*" is the terminator that the recorder uses. "*CRLF*" will be used in the explanation of the syntax. In the response examples, "*CRLF*" will be omitted.

2.9.2 Negative Response

If a command syntax error, setting error, or other error occurs, the recorder returns a negative response.

Syntax

E1,p,p,•••,p*CRLF*

p Error number and the position of error occurrence
The detailed format of p is indicated below. The recorder outputs the error number, the position of the command where the error occurred, and the position of the parameter where the error occurred, each separated by a colon.
en:cp:pp
- en Error number.
- cp A value indicating the command position where the error occurred. The position is numbered in order with the first command as 1. For a single command, the recorder outputs 1.
- pp A value indicating the parameter position where the error occurred. The position is numbered in order with the first parameter in each command as 1. For errors that pertain to the entire command (for example, error in the command name), the recorder outputs 0.
  If errors occur in multiple parameters, the recorder outputs numbers separated by commas in ascending order.

Response Example 1

If error number 3 occurs in the second parameter of a single command, the recorder outputs:

```
E1,3:1:2
```

Response Example 2

If error number 1 occurs in the third parameter and error number 100 occurs in the fifth parameter of a single command, the recorder outputs:

```
E1,1:1:3,100:1:5
```

Response Example 3

In a string of two commands, if error number 10 occurs in the second parameter of the first command and error number 500 occurs in the fifth parameter of the second command, the recorder outputs:

```
E1,10:1:2,500:2:5
```

Error Messages

You can use the “instrument’s error number information output command” (_ERR) to output the error message that corresponds to an error number of a negative response.

2.9.3 Data Output Response

There are two types of data output: ASCII and binary.

ASCII Output

The responses to the following commands are in ASCII.

- Queries for operation commands and setting commands
- ASCII data output requests of output commands

Syntax

EA*CRLF*
ASCII string data • • • • • • • • • *CRLF*
ASCII string data • • • • • • • • • *CRLF*
|
ASCII string data • • • • • • • • • *CRLF*
EN*CRLF*

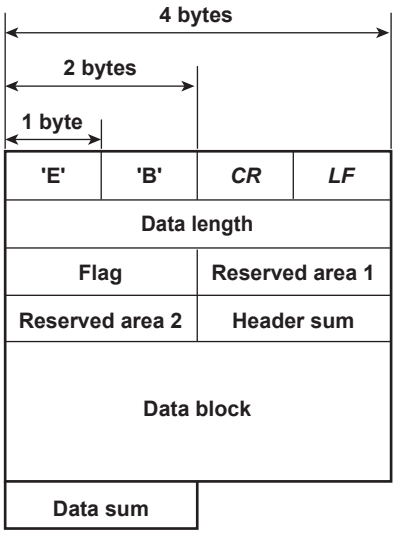
The recorder adds a header (EA) in front of the ASCII string output data and a footer (EN) at the end. The recorder adds the two characters *CRLF* to the end of headers, footers, and ASCII string data.

Binary Output

The responses to output commands consisting of binary data output requests are in binary.

Format

The following figure shows the binary output format. The recorder adds a header to the front of binary output data and a checksum at the end. The request data is entered in the data block.



EB*CRLF*

The EB*CRLF* block stores ASCII code "E," ASCII code "B," followed by "*CR*" "*LF*." This indicates that the output data is binary.

Data length (32 bits, big endian)

The data length block indicates the length of "flag + reserved area 1 + reserved area 2 + header sum + data block + data sum" in bytes.

Flag (16 bits, big endian)

The flag block indicates information of the entire data block.

Bit	Flag Value		Flag Meaning
	0	1	
15	Always zero		Not used
14	No	Yes	Data sum inclusion
13	Always zero		Not used
:			
1			
0	Intermediate data	Last data	If the output data is continuous data, this flag indicates whether the last value in the data block is intermediate data or last data.

Reserved area 1 (16 bits), reserved area 2 to (16 bits)

Not used

Header sum (16 bits, big endian)

The header sum block indicates the sum of "data length + flag + reserved area 1 + reserved area 2."

Data Block

The actual output data. The format varies depending on the output content. For details, see section **2.11**, "**Format of the Data Block of Binary Output**."

Data sum (16 bits, big endian)

The data sum block indicates the sum of the data block. Use the CCheckSum command to specify whether to include data sum. By default, check sum is set to "No." Whether data sum is included is expressed by a flag in the header block. If the data sum block is not included, the area itself will not be included. For the check sum calculation method, see **Appendix 5 Check Sum Calculation Method**.

2.9.4 Output in Response to RS-422/485 Commands

The table below shows the responses to the ESC O command and ESC C command. ESC in ASCII code is 0x1B. For details, see **Appendix 1 ASCII Character Codes**.

Syntax	Meaning	Response
ESC O_xx*CRLF* (_: Space)	Opens an instrument	• Response from the destination instrument ESC Oxx*CRLF* • If there is no instrument at the address specified by the command* No response
ESC C_xx*CRLF* (_: Space)	Closes an instrument	• Response from the destination instrument ESC Cxx*CRLF* • If there is no instrument at the address specified by the command* No response

* Some possible reasons why the condition "there is no instrument at the address specified by the command" occurs are command error, the address assigned to the instrument is different, the instrument is not turned on, and the instrument is not connected through serial interface.

- "xx" in the table represents the instrument address. You can specify any address within the range of 01 to 99 and within the addresses assigned to the communication target instruments.
- You can only open one instrument at any given time.
- When you open an instrument with the ESC O command, you can send commands to it.
- Use CR+LF for the terminator.

2.10 ASCII Output Format

This section explains the ASCII output format.

- In the following format descriptions, the terminator is denoted by "<crlf>."
- One space (ASCII code : 0x 20) is denoted by an underscore (_). Consecutive spaces are denoted by alternating underscores (_) and overscores (‾).
- An I/O channel is expressed as a four-digit number (e.g., 0102), a math channel is expressed as "A" followed by a three-digit number (e.g., A015), and a communication channel is expressed as "C" followed by a three-digit number (e.g., C120).

2.10.1 Most Recent Channel Data (FData)

The output in response to the command "FData,0" is shown below.

Syntax

```
EA<crlf>
DATE_yy/mo/dd<crlf>
TIME_hh:mm:ss.mmmt<crlf>
s_cccca1a2a3a4uuuuuuuuuufddddddddE-pp<crlf>
s_cccca1a2a3a4uuuuuuuuuufddddddddE-pp<crlf>
…
s_cccca1a2a3a4uuuuuuuuuufddddddddE-pp<crlf>
EN<crlf>
```

yy/mo/dd	Data time (year, month, day)	
	yy	Year (00 to 99)
	mo	Month (01 to 12)
	dd	Day (01 to 31)
hh:mm:ss.mmmt	Data time (hour, minute, second, millisecond)	
	hh	Hour (00 to 23)
	mm	Minute (00 to 59)
	ss	Second (00 to 59)
	mmm	Millisecond (000 to 999)
	A period is inserted between the minute and millisecond.	
t	Reserved (space)	
s	Data status	
	N	Normal
	D	Differential input
	S	Skip
	O	Over
	E	Errors
	B	Burnout
	C	Communication channel error
cccc	Channel number (I/O channel, math channel, communication channel)	
$a_1a_2a_3a_4$	a_1	Alarm status (level 1)
	a_2	Alarm status (level 2)
	a_3	Alarm status (level 3)
	a_4	Alarm status (level 4)
	a_1, a_2, a_3, and a_4 is set to one of the following:	
	H	High limit alarm
	L	Low limit alarm
	h	Difference high limit alarm
	l	Difference low limit alarm
	R	High limit on rate-of-change alarm
	r	Low limit on rate-of-change alarm
	T	Delay high limit alarm
	t	Delay low limit alarm
	Space	No alarm
uuuuuuuuuu	Unit (fixed to 10 characters. Output flush left. Unused character positions are filled with spaces.)	
	mV_‾_‾_‾_‾	mV
	V_‾_‾_‾_‾_‾	V

°C °C

f	Sign (+ or -)
dddddddd	Mantissa (00000000 to 99999999; 8 digits) For erroneous data (data status is E), the mantissa is 99999999. If the data status is O (±over), the mantissa is 99999999 (+over) or –99999999 (–over). If the data status is B (burnout), the mantissa is 99999999 (+burnout) or –99999999 (–burnout).
pp	Exponent (00 to 05) On channels set to Log scale (/LG), pp is a two digit integer, and the sign before pp is + or -. If the data status is E, O, or B, this value will be +99, including the sign.

2.10.2 Most Recent (DO Channel) Status (FRelay)

The output in response to the command “FRelay,0” is shown below.

Syntax

When no expandable I/O is connected

```
EA<crlf>
M00:aaa…<crlf>
M01:aaa…<crlf>
M02:aaa…<crlf>
M03:aaa…<crlf>
M04:aaa…<crlf>
M05:aaa…<crlf>
M06:aaa…<crlf>
M07:aaa…<crlf>
M08:aaa…<crlf>
M09:aaa…<crlf>
EN<crlf>
```

When an expandable I/O or sub unit is connected

Only the information of detected units will be output.

```
EA<crlf>
Unit:nnf
M00:aaa…<crlf>
M01:aaa…<crlf>
M02:aaa…<crlf>
M03:aaa…<crlf>
M04:aaa…<crlf>
M05:aaa…<crlf>
M06:aaa…<crlf>
M07:aaa…<crlf>
M08:aaa…<crlf>
M09:aaa…<crlf>
Unit:nnf
M00:aaa…<crlf>
M01:aaa…<crlf>
M02:aaa…<crlf>
M03:aaa…<crlf>
M04:aaa…<crlf>
M05:aaa…<crlf>
M06:aaa…<crlf>
M07:aaa…<crlf>
M08:aaa…<crlf>
M09:aaa…<crlf>
:
Unit:nnf
M00:aaa…<crlf>
M01:aaa…<crlf>
M02:aaa…<crlf>
M03:aaa…<crlf>
M04:aaa…<crlf>
```

```
M05:aaa…<crlf>
M06:aaa…<crlf>
M07:aaa…<crlf>
M08:aaa…<crlf>
M09:aaa…<crlf>
EN<crlf>
```

nn	Unit number	
f	*	Main unit
	(Space)	Expandable I/O or sub unit
aaa…	Outputs the relay (DO channel) status of module numbers 00 to 09. If the module installed in the corresponding module number is not a DO module, a hyphen is output. If the module installed in the corresponding module number is a DO module, “1” or “0” is output for the number of channels in the module in ascending order by channel number. “1” indicates relay (DO channel) ON state, and “0” indicates relay (DO channel) OFF state.	

2.10.3 Internal Switch Status (FRelay)

The output in response to the command “FRelay,1” is shown below.

Syntax

```
EA<crlf>
S001-010:aaaaaaaaaa<crlf>
S011-020:aaaaaaaaaa<crlf>
S021-030:aaaaaaaaaa<crlf>
S031-040:aaaaaaaaaa<crlf>
S041-050:aaaaaaaaaa<crlf>
S051-060:aaaaaaaaaa<crlf>
S061-070:aaaaaaaaaa<crlf>
S071-080:aaaaaaaaaa<crlf>
S081-090:aaaaaaaaaa<crlf>
S091-100:aaaaaaaaaa<crlf>
EN<crlf>
```

`aaa…a` The most recent internal switch status is output.
The internal switch status is output 10 channels per line over 10 lines.
“1” indicates that the internal switch is ON, and “0” indicates that the internal switch is OFF.

2.10.4 Users Who Are Currently Logged In (FUser)

The output in response to the command “FUser,0” is shown below.

Syntax

```
EA<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
EN<crlf>
```

`p` Login mode
- `M` Via general communication
- `W` Via Web (HTTP server)
- `F` Via FTP server
- `S` RS-232, RS-422/485, USB communication, or Bluetooth
- `D` Via front panel

`l` User level
- `A` Administrator
- `U` User
- `M` Monitor (only when the advanced security function (/AS) enabled)

`uuuuuuuuuuuuuuuuuuuu` User name (fixed to 20 characters. Unused character positions are filled with spaces.)

`abcdefghijkmnpqrstuvwxy` Authority of user
- `F` Free
- `L` Lock

a through y represent actions. p through y are output only when the advanced security function (/AS) is enabled.
- `a` Memory
- `b` Math
- `c` Data save
- `d` Message
- `e` Batch
- `f` Alarm ACK
- `g` Communication
- `h` Touch operation
- `i` Time set
- `j` Setting operation
- `k` External media
- `m` System operation
- `n` Output operation
- `p` Calibration correction setting operation
- `q` to `y` Not used (Spaces)

2.10.5 All Users Who Are Currently Logged In (FUser)

The output in response to the command “FUser,1” is shown below.

Syntax

```
EA<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
EN<crlf>
```

`p` Login mode
- `M` Via general communication
- `W` Via Web (HTTP server)
- `F` Via FTP server
- `S` RS-232, RS-422/485, USB communication, or Bluetooth
- `D` Via front panel

`l` User level
- `A` Administrator
- `U` User
- `M` Monitor (only when the advanced security function (/AS) enabled)

`uuuuuuuuuuuuuuuuuuuu` User name (fixed to 20 characters. Unused character positions are filled with spaces.)

`abcdefghijkmnpqrstuvwxy` Authority of user
- `F` Free
- `L` Lock

a through y represent actions. p through y are output only when the advanced security function (/AS) is enabled.
- `a` Memory
- `b` Math
- `c` Data save
- `d` Message
- `e` Batch
- `f` Alarm ACK
- `g` Communication
- `h` Touch operation
- `i` Time set
- `j` Setting operation
- `k` External media
- `m` System operation
- `n` Output operation
- `p` Calibration correction setting operation
- `q` to `y` Not used (Spaces)

2.10.6 Instrument Address (FAddr)

The output in response to the command “FAddr,IP” is shown below.

Syntax

```
EA<crlf>
IP_Address_ _ _ :xxx.xxx.xxx.xxx<crlf>
Subnet_Mask_ = = :xxx.xxx.xxx.xxx<crlf>
Default_Gateway_:xxx.xxx.xxx.xxx<crlf>
Primary_DNS_ _ _:xxx.xxx.xxx.xxx<crlf>
Secondary_DNS_ _:xxx.xxx.xxx.xxx<crlf>
Host_ _ _ _ _ _:yyyyyyyyyyyyyyyyyyyy…<crlf>
Domain_ _ _ _ _ :zzzzzzzzzzzzzzzzzzzz…<crlf>
EN<crlf>
```

xxx	IP address number (0 to 255)
yyy...	Host name (fixed to 64 characters. Unused character positions are filled with spaces.)
zzz...	Domain name (fixed to 64 characters. Unused character positions are filled with spaces.)

2.10.7 GX status (FStat)

The output in response to the command “FStat,0” is shown below.

Syntax

```
EA<crlf>
aaa.bbb.ccc.ddd<crlf>
EN<crlf>
```

aaa	Status information 1 (see table below)
bbb	Status information 2 (see table below)
ccc	Status information 3 (see table below)
ddd	Status information 4 (see table below)

Status Information 1

Bit	Name	Description
0	-	-
1	Memory sampling	Set to 1 during recording
2	Computing	Set to 1 while computation is in progress.
3	Alarm activated	Set to 1 when an alarm is activated.
4	Accessing medium	Set to 1 while the SD medium is being accessed.
5	E-mail started	Set to 1 while the e-mail transmission has been started.
6	Buzzer activated	Set to 1 when the buzzer is activated.
7	-	-

Status Information 2

Bit	Name	Description
0	-	-
1	-	-
2	Memory end	Set to 1 when the free space in the external memory is low.
3	Touch operation login	Set to 1 when a user is logged in through touch operation.
4	User lock out present	Set to 1 when a user lock out occurs, and remains at 1 until user locked ACK is issued (only when the advanced security function (/AS) enabled).
5	-	-
6	Measurement error	Set to 1 while measurement errors are detected on an AI module or when a burnout has occurred.
7	Communication error	Set to 1 when a Modbus master, Modbus client, or WT communication error has occurred.

Status 3 and 4 are edge operations. They are cleared when read.

Status Information 3

Bit	Name	Description
0	Computation dropout	Set to 1 when computation cannot keep up.
1	Decimal and unit information setting	Set to 1 when the decimal or unit information is changed.
2	Command error	Set to 1 when there is a command syntax error.
3	Execution error	Set to 1 when there is a command execution error.
4	SNTP error at startup	Set to 1 when SNTP time synchronization fails at startup.
5	-	-
6	-	-
7	-	-

Status Information 4

Bit	Name	Description
0	-	
1	Medium access complete	Set to 1 when a display, event, manual-sample, report, or screen-image data file is saved to the external storage medium. Set to 1 when settings have been successfully saved or loaded.
2	Report generation complete	Set to 1 when report generation is complete.
3	Timeout	Set to 1 when a timer expires.
4	Saving or loading complete	Set to 1 when the saving or loading of setting parameters, report template, scale image, and custom display settings is complete.
5	-	-
6	-	-
7	-	-

2.10.8 Alarm Summary (FLog)

The output in response to the command “FLog,ALARM” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss.ttt_kkk_cccc_lss<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss.ttt` Time of alarm occurrence

`yyyy`	Year (1900 to 2099)
`mo`	Month (01 to 12)
`dd`	Day (01 to 31)
`hh`	Hour (00 to 23)
`mm`	Minute (00 to 59)
`ss`	Second (00 to 59)
`ttt`	Millisecond (000 to 999)

A period is inserted between the minute and millisecond.

`kkk` Alarm cause

`OFF`	Alarm release
`ON_`	Alarm occurrence
`ACK`	All channel alarm ACK, Individual alarm ACK
`ALL`	All channel alarm OFF

`cccc` Channel number (set to four spaces if the alarm cause is “ACK” or “ALL”)

`l` Alarm level (1 to 4)

`ss` Alarm type

`H_`	High limit alarm
`h_`	Difference high limit alarm
`L_`	Low limit alarm
`l_`	Difference low limit alarm
`R_`	High limit on rate-of-change alarm
`r_`	Low limit on rate-of-change alarm
`T_`	Delay high limit alarm
`t_`	Delay low limit alarm

If the cause of alarm is “all channel alarm ACK” or “all channel alarm OFF,” the channel number, alarm level, and alarm type will be blank.
If the cause of alarm is “individual alarm ACK,” the alarm type will be blank.

2.10.9 Message Summary (FLog)

The output in response to the command “FLog,MSG” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_YYYY/MO/DD_HH:MM:SS_t_mmm…m_zzz_ggg…g_uuu…
u<crlf>
…
EN<crlf>
```

yyyy/mo/dd_hh:mm:ss	Time when the message was written	
	yyyy	Year (1900 to 2099)
	mo	Month (01 to 12)
	dd	Day (01 to 31)
	hh	Hour (00 to 23)
	mm	Minute (00 to 59)
	ss	Second (00 to 59)
YYYY/MO/DD_HH:MM:SS	Data position where message was written	
	YYYY	Year (1900 to 2099)
	MO	Month (01 to 12)
	DD	Day (01 to 31)
	HH	Hour (00 to 23)
	MM	Minute (00 to 59)
	SS	Second (00 to 59)
t	Message type	
	N	Normal message
	H	Freehand message
mmm…m	Message (fixed to 48 characters. Unused character positions are filled with spaces.) For freehand message, the string “(image)” is output.	
zzz	Operation property (3 characters)	
	KEY	Touchscreen operation, key operation
	REM	Remote
	COM	Ethernet communication
	SER	Serial communication (RS-232, RS-422/485, USB communication, or Bluetooth)
	ACT	Event action
	SYS	System
	EXT	Operation from an external device (e.g. Modbus)
ggg…g	Target group (multiple groups are expressed using dot delimiters) (fixed to 16 characters. Unused character positions are filled with spaces.)	
	ALL	All display groups
	aa.bb.cc.dd…	Multiple display groups
uuu…u	User name (fixed to 20 characters. Unused character positions are filled with spaces.)	

2.10.10 Event log (FLog)

The output in response to the command “FLog,EVENT” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_zzz_-sss…s_uuu…u<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss` Time of event occurrence

`yyyy`	Year (1900 to 2099)
`mo`	Month (01 to 12)
`dd`	Day (01 to 31)
`hh`	Hour (00 to 23)
`mm`	Minute (00 to 59)
`ss`	Second (00 to 59)

`zzz` Event cause

`KEY`	Touchscreen operation, key operation
`REM`	Remote
`COM`	Ethernet communication
`SER`	Serial communication (RS-232, RS-422/485, USB communication, or Bluetooth)
`ACT`	Event action
`SYS`	System
`EXT`	Operation from an external device (e.g. Modbus)

`sss…s` Event string (fixed to 16 characters. Unused character positions are filled with spaces.)
See section **“2.10.19 Detail Event Log Output (FEventLog) (/AS)”**.

`uuu…u` User name (fixed to 20 characters. Unused character positions are filled with spaces.)

2.10.11 Error Log (FLog)

The output in response to the command “FLog,ERROR” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_nnn_uuu…u<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss` Time of error occurrence

`yyyy`	Year (1900 to 2099)
`mo`	Month (01 to 12)
`dd`	Day (01 to 31)
`hh`	Hour (00 to 23)
`mm`	Minute (00 to 59)
`ss`	Second (00 to 59)

`nnn` Error code (001 to 999)

`uuu…u` Error message (fixed to 80 characters. Unused character positions are filled with spaces.)

2.10.12 Address Setting Log (FLog)

The output in response to the command “FLog,DHCP” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_kkk…k_mmm…m<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss` Time of occurrence

`yyyy`	Year (1900 to 2099)
`mo`	Month (01 to 12)
`dd`	Day (01 to 31)
`hh`	Hour (00 to 23)
`mm`	Minute (00 to 59)
`ss`	Second (00 to 59)

`kkk…k` Type (fixed to 15 characters. Unused character positions are filled with spaces. See table below.)

`mmm…m` Message (fixed to 20 characters. Unused character positions are filled with spaces. See table below.)

Type	Message	Error Message
LINK	ON	Ethernet connection detected
	OFF	Ethernet disconnection detected
SET	Address (e.g., 10.0.122.3)	IP address set
DHCP	OFF	DHCP disabled
	ON	DHCP enabled
	RENEWING	Acquired IP address renewing
	RELEASING	Acquired IP address releasing
	REJECTING	Acquired IP address rejecting*
	RENEWED	IP address renewed
	RELEASED	IP address released
	EXTENDED	IP address extension application complete
	ESEND	DHCP message transmission failed
	ESERVER	DHCP server search failed
	ESERVFAIL	DHCP server response failed (reception timeout)
	ERENEWED	IP address renewal failed
	ERELEASED	IP address release failed
	EEXTENDED	IP address extension application failed
	EEXPIRED	IP address lease expiration
DNS	UPDATED	DNS host name registration complete
	REMOVED	DNS host name removal complete
	EFORMERR	DNS message syntax error
	ESERVFAIL	DNS server processing error
	ENXDOMAIN	DNS server query rejected (domain does not exist)
	EREFUSED	DNS server query rejected (process not allowed)
	EYXDOMAIN	DNS server query rejected (record exists)
	EYXRESET	DNS server query rejected (record exists)
	ENXRESET	DNS server query rejected (record does not exist)
	ENOTAUTH	DNS server query rejected (not authenticated)
	ENOTZONE	DNS server query rejected (query error)
	ENOTIMP	DNS server query rejected (The command is not implemented.)
	ENONAME	Tried to register an blank host name to the DNS server.

* If the recorder cannot accept the IP address obtained from the DHCP server, the recorder will reject the address and immediately return a response to the DHCP server.

2.10.13 General Communication Log (FLog)

The output in response to the command “FLog,General” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_nn_uuu…u_fdmmm…m<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss` Time of command Tx/Rx

`yyyy`	Year (1900 to 2099)
`mo`	Month (01 to 12)
`dd`	Day (01 to 31)
`hh`	Hour (00 to 23)
`mm`	Minute (00 to 59)
`ss`	Second (00 to 59)

`nn` Connection ID

`s0`	Serial (general)
`s1`	Bluetooth connection
`s2`	USB connection
`e0`	Ethernet connection #0 (general)
`e1`	Ethernet connection #1 (general)
`e2`	Ethernet connection #2 (general)
`e3`	Ethernet connection #3 (general)

`uuu…u` User name (fixed to 20 characters. Unused character positions are filled with spaces.)

`f` Multiple command flag

Space	Single command
`*`	Multiple commands

`d` Tx/Rx

`>`	Tx (command: connected instrument to recorder)
`<`	Rx (Response: recorder to connected instrument)

`mmm…m` Message (fixed to 40 characters. Unused character positions are filled with spaces.)

The recorder normally outputs the data that has been transmitted or received as-is, but it sometimes outputs special messages. Special messages are shown below.

`(output)`	Data output
`(Over length)`	Command length too long
`(timed out)`	Timeout
`(disconnected)`	Disconnection (occurs when an Ethernet connection is disconnected)

2.10.14 Modbus Communication Log (FLog)

The output in response to the command “FLog,Modbus” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_c_xxxxxx_kkk…k_nnn_d<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss` Time of error occurrence

`yyyy`	Year (1900 to 2099)
`mo`	Month (01 to 12)
`dd`	Day (01 to 31)
`hh`	Hour (00 to 23)
`mm`	Minute (00 to 59)
`ss`	Second (00 to 59)

`c` Communication type

`M`	Modbus master
`C`	Modbus client

`xxxxxx` Event that occurred (fixed to 6 characters)

`ACTIVE`	Activated
`READY_`	Command ready state
`CLOSE_`	Disconnected
`HALT__`	Command halted
`___`	Other than those above

`kkk…k` Details (fixed to 15 characters. Unused character positions are filled with spaces. See table below.)

`nnn` Command number (0 to 999)

`d` Command type

`R`	Read
`W`	Write
`O`	Write immediately (write from the custom display)
`N`	Miscellaneous

Detail*	Meaning
`SKIP`	Command not set.
`INVALID`	Command cannot be executed.
`WAITING`	Server/slave communication recovery wait.
`CLOSED`	Server/slave connection closed.
`RESOLVING`	Server/slave connection being established (resolving address).
`CONNECTING`	Server/slave connection being established (requesting connection).
`UNREACH`	Server/slave connection failed (peer not found).
`TIMEDOUT`	Server/slave connection failed (timeout occurred).
`BROKEN`	Response message corrupt (CRC error).
`ERR_FC`	Response message was an illegal function message.
`ERR_ADDR`	Response message was an illegal data address message.
`ERR_VALUE`	Response message was an illegal data value message.
`ERR_DEVICE`	Response message was a slave device failure message
`ERR_ACK`	Response message was an acknowledge message.
`ERR_BUSY`	Response message was a slave device busy message.
`ERR_NEGATIVE`	Response message was a negative acknowledge message.
`ERR_GATE_PATH`	Response message was a gateway path unavailable message.
`ERR_GATE_TARGET`	Response message was a gateway target device failed to respond message.
`BAD_SLAVE`	The slave address of the response message is invalid (does not match the command).
`BAD_FC`	The function code of the response message is invalid (does not match the command).

Detail*	Meaning
BAD_ADDR	The address of the response message is invalid (does not match the command).
BAD_NUM	The register of the response message is invalid (does not match the command).
BAD_CNT	The number of registers in the response message is invalid (does not match the command).
NO_DATA	Data has not yet been received once.
BAD_DATA	Data conversion of the response message failed.
VALID	Data is being acquired normally.
DROP_OUT	Communication dropout occurred due to the inability to keep up.
STALE	The response from the connected device is slow relative to the read cycle.
START	Modbus or communication settings were changed.
STOP	Modbus or communication settings were changed.

* "_" expresses an underscore.

2.10.15 FTP Client Log (FLog)

The output in response to the command "FLog,FTP" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_xxxxxxxxx_k_fff…f<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss` Time of error occurrence

`yyyy`	Year (1900 to 2099)
`mo`	Month (01 to 12)
`dd`	Day (01 to 31)
`hh`	Hour (00 to 23)
`mm`	Minute (00 to 59)
`ss`	Second (00 to 59)

`xxxxxxxxx` Detailed code (fixed to 9 characters)

`TCPIP_ _`	Internal processing error
`HOSTADDR_`	IP address not set
`HOSTNAME_`	Unable to resolve server host name
`UNREACH_ `	Unable to connect to server
`CONNECT_ `	Unable to connect to data port
`SEND_ _ _`	Transmission to data port failed
`RECV_ _ _`	Reception from data port failed
`REPLY_ _ `	Received reject response from server
`SERVER_ _`	Invalid server response
`CMDSEND_ `	Error in sending command to control port
`CMDRECV_ `	Error in receiving command from control port
`USER_ _ _`	Invalid user name
`PASS_ _ _`	Invalid password
`ACCT_ _ _`	Internal processing error
`TIMEOUT_ `	Response timeout
`LINK_ _ _`	Ethernet cable not connected
`FILE_ _ _`	File access failed
`NOFD_ _ _`	Internal processing error
`NOID_ _ _`	Internal processing error
`PARAM_ _ `	Internal processing error
`CERT_ _ _`	Certificate verification error
`SSL_ _ _`	Encryption communication error

`k` Server type (P, S)

`fff…f` File name (fixed to 51 characters including extension. Unused character positions are filled with spaces.)

2.10.16 SNTP (Time Adjustment) Client Log (FLog)

The output in response to the command “FLog,SNTP” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_nnn_xxxxxxxxx<crlf>
…
EN<crlf>
```

yyyy/mo/dd_hh:mm:ss	Time of error occurrence	
	yyyy	Year (1900 to 2099)
	mo	Month (01 to 12)
	dd	Day (01 to 31)
	hh	Hour (00 to 23)
	mm	Minute (00 to 59)
	ss	Second (00 to 59)
nnn	Error code	
xxxxxxxxx	Detailed code (fixed to 9 characters)	
	SUCCESS_	Success
	EOVER_ _	Adjustment limit exceeded
	EDORMANT_	Internal processing error
	EHOSTNAME	Host name lookup failed
	ETCPIP_ _	Internal processing error
	ESEND_ _	Packet transmission failed
	ETIMEDOUT	Response timeout occurred
	EBROKEN_	Response packet corrupt
	ERECV_ _	Reception error
	EINVALID_	Internal processing error
	ENOID_ _	Internal processing error

2.10.17 E-Mail Client Log (FLog)

The output in response to the command “FLog,MAIL” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_ffffff_eeeeeeeeeeee_n_uuu…u<crlf>
…
EN<crlf>
```

yyyy/mo/dd_hh:mm:ss	Time of transmission	
	yyyy	Year (1900 to 2099)
	mo	Month (01 to 12)
	dd	Day (01 to 31)
	hh	Hour (00 to 23)
	mm	Minute (00 to 59)
	ss	Second (00 to 59)
ffffff	Cause (fixed to 6 characters)	
	ALARM_	Alarm mail
	TIMER_	Scheduled mail
	POWER_	Power-on, power failure recovery
	Memory	Low external storage memory
	ERROR_	Error notification
	REPORT	Report file
	TEST_	Test mail
	PASSWD	User lock out
eeeeeeeeeeee	Detailed error code (fixed to 12 characters)	
	HOSTADDR_ _	IP address not set
	HOSTNAME_ _ _	Unable to resolve server host name
	TIMEOUT_ _ _	Communication with server timed out
	LINK_ _ _ _ _	Ethernet cable not connected
	UNREACH_ _ _	Unable to connect to server
	HELO_ _ _ _ _	Server rejected greeting message
	MAILFROM_ _ _	Server rejected sender
	RCPTTO_ _ _ _	Server rejected recipient
	DATA_ _ _ _ _	Server rejected the data transmission command
	TCPIP_ _ _ _	Internal processing error
	INVAL_ _ _ _	Internal processing error
	SMTPAUTH_ _	SMTP AUTH authentication failed
	ANOTSUPPORT_	Unsupported authentication method
	POP3UNREACH_	Unable to connect to POP3 server
	POP3TIMEOUT_	POP3 server connection timed out
	POP3HOSTNAME	Unable to resolve POP3 host name
	POP3AUTH_ _ _	POP3 server authentication failed
	CERT_ _ _ _ _	Certificate verification error
	SSL_ _ _ _ _	Encryption communication error
n	recipient	
	1	Recipient 1
	2	Recipient 2
	+	Recipient 1+2
uuu…u	Recipient mail address (fixed to 30 characters. Unused character positions are filled with spaces.) The user name section of the recipient mail address (the “XXXX” section of “XXXX@abc.def.ghi”) is output.	

2.10.18 Web Log (FLog)

The output in response to the command “FLog,WEB” is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_xxx.xxx.xxx.xxx_mmmmmmmm_uuu…u_ccc_nnn…<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss` Time of error occurrence
- `yyyy` Year (1900 to 2099)
- `mo` Month (01 to 12)
- `dd` Day (01 to 31)
- `hh` Hour (00 to 23)
- `mm` Minute (00 to 59)
- `ss` Second (00 to 59)

`xxx.xxx.xxx.xxx` Source IP address

`mmmmmmmm` HTTP query method
- `GET` GET method
- `POST` POST method

`uuu…u` Access destination URL (fixed to 24 characters. Unused character positions are filled with spaces.)

`ccc` HTTP response code (fixed to 32 characters. Unused character positions are filled with spaces. See table below.)

`nnn…` Error message (see table below)

HTTP Response Code	Error Message
100	Continue
101	Switching Protocols
201	Created
202	Accepted
203	Non-Authoritative Information
204	No Content
205	Reset Content
206	Partial Content
400	Bad Request
401	Unauthorized
403	Forbidden
404	Not Found
405	Method Not Allowed
406	Not Acceptable
407	Proxy Authentication Required
408	Request Time-out
409	Conflict
410	Gone
411	Length Required
412	Precondition Failed
413	Request Entity Too Large
414	Request-URI Too Large
415	Unsupported Media Type
500	Internal Server Error
501	Not Implemented
502	Bad Gateway
503	Server Unavailable
504	Gateway Time-out
505	HTTP Version Not Supported

2.10.19 Detail Event Log Output (FEventLog) (/AS)

The output in response to the command "FEventLog" is shown below. Output is possible when the advanced security function (/AS) is enabled.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_zzz_sss…s_uuu…u_ddd…<crlf>
…
EN<crlf>
```

yyyy/mo/dd_hh:mm:ss	Time of event occurrence		
	yyyy	Year (1900 to 2099)	
	mo	Month (01 to 12)	
	dd	Day (01 to 31)	
	hh	Hour (00 to 23)	
	mm	Minute (00 to 59)	
	ss	Second (00 to 59)	
zzz	Event cause		
	KEY	Touchscreen operation, key operation	
	REM	Remote	
	COM	Ethernet communication	
	SER	Serial communication (RS-232, RS-422/485, USB communication, or Bluetooth)	
	ACT	Event action	
	SYS	System	
	EXT	Operation from an external device (e.g. Modbus)	
sss…s	Event string (fixed to 16 characters. Unused character positions are filled with spaces. See the table below.)		
uuu…u	User name (fixed to 20 characters. Unused character positions are filled with spaces.)		
ddd…	Detailed information (see table below)		

Event string, detailed information

Operations that are marked with an asterisk will be logged regardless of whether the advanced security function is enabled or disabled.
All other operations are logged only when the advanced security function (/AS) is enabled.

Operation	Event string Information is included in ###	### information and detailed information Blue text indicates the detailed information output format.		
Error				
Error occurrence	Error###	###	Error number (output in the event string)	
A/D calibration operation				
A/D calibration	ExecA/DCal	Unit:uu,Slot:ss		
			uu	Unit
			ss	Slot
Login				
Power off*	POWER OFF	—		
Power on*	POWER ON	—		
Login*	LOGIN	—		
Logout*	LOGOUT	—		
User lock out	UserLocked	User:UUU		
			UUU	User number
Control				
Mode change	ChgMode	ss•••		
			ss•••	Mode [Operate, A/Dcal, FirmUpdate]
Time change*	TIME CHANGE	—		
New time*	NEW TIME	—		
Start time adjustment*	TIME ADJ START	amm:ss:xxx.yyy		
			Difference	

Operation	Event string	### information and detailed information
		a Sign (- lag, + lead) mm Minute ss Second xxx Millisecond yyy Microsecond Example: +00:01:000.000
Stop time adjustment*	TIME ADJ END	—
SNTP time change*	SNTP ADJUST	—
DST start*	DST START	—
DST end*	DST END	—
Password change	ChgPasswd	User:UUU UUU User number
User locked ACK	UserLockedACK	—
Alarm ACK	AlarmACK	Channel:cc•••,Level:ll••• cc••• Channel (ALL for all ACK) ll••• Level (ALL for all ACK)
Message writing	Message###	### Message number (output in the event string) Normal messages: 001 to 100 Free messages: F01 to F10 Freehand message: Hnd <Detailed information> Data Time:tt••• tt••• Data timestamp (only for add messages. Not output for other messages.) The format is the same as the time section of the FLog command output. Example: Data Time:2012/03/13 10:25:28
Recording start	Record Start	—
Recording stop	Record Stop	—
Manual sample	ManualSample	—
Math start	MathStart	—
Math stop	MathStop	—
Math reset	MathRST	—
Acknowledge math dropout	MathACK	—
Mail start	MailStart	—
Mail stop	MailStop	—
Modbus manual recovery	RefModbus	ss••• ss••• Type [Client, Master]
Display data saved	SaveDisp	—
Event data saved	SaveEvent	—
Manual data saved	ManualSave	ss••• ss••• Data type [Data, Report, ManualSample, AlarmSummary]. [All] for all data. [Cancel] if canceled.
Snapshot	Snapshot	—
Set batch number	SetBatchNo	—
Set lot number	SetLotNo	—
Batch text Field setting	SetTextField	No:nn nn Text field number
Display update rate change	ChgRate	ss••• ss••• Trend interval string Example: 1min/div

Operation	Event string	### information and detailed information
Timer reset	TimerRST	Timer:tt•••
		tt••• Timer number (ALL for all timers)
Match time timer reset	MTimerRST	Timer:tt•••
		tt••• Timer number (ALL for all timers)
Communication channel write (screen operation only)	WriteComm	kk•••,CCCC=dd•••
		kk••• Write type [Internal,External]
		C Communication channel
		dd••• Value
		Example: Internal,C001=1.234
DO channel write (for manual operation) (screen operation/ general communication command only)	WriteDO	CCCC=dd•••
		C DO channel
		dd••• Value [ON, OFF]
		Example: 0901=OFF
SW channel write (for manual operation) (screen operation/general communication command only)	WriteSW	CCCC=dd•••
		C Internal switch
		dd••• Value [ON, OFF]
		Example: S001=ON
Settings saved	Save##########	##•# Save type (output in the event string)
		Report Report
		Scale Scale image
		Custom Custom display
		Parameter Setting parameter
		Cert Certificate
		All All settings
		<Detailed information>
		---- When ### = Report ----
		cc•••,rr•••
		cc••• Report format [EXCEL, PDF]
		rr••• Report type [Hour, Day, Week, Month, Hour+Day, Day+Week, Day+Month, Batch, Custom]
		---- When ### = Scale ----
		Group:gg
		gg Group number
		---- When ### = Custom ----
		No:nn•••
		nn••• Display number (ALL for all custom display screen)
Settings loaded	Load##########	##•# Load type (output in the event string)
		Report Report
		Scale Scale image
		Custom Custom display
		Parameter Setting parameter
		Cert Certificate
		All All settings
		<Detailed information>
		---- When ### = Report ----
		cc•••,rr•••
		cc••• Report format [EXCEL, PDF]
		rr••• Report type [Hour, Day, Week, Month, Hour+Day, Day+Week, Day+Month, Batch, Custom]

Operation	Event string	### information and detailed information
		---- When ### = Scale ---- Group:gg gg Group number ---- When ### = Custom ---- No:nn••• nn••• Display number (ALL for all custom display screen) ---- When ### = Parameter ---- ss••• ss••• Loaded settings [Security, IP, Other, All]
Create a key	GeneKey######	##•# Action (output in the event string) Start Start Done Complete Cancel Cancel
Installation of certificate	InstallServCert	ss•••,kk••• ss••• Certification type: Main/Middle [Main, Chained] kk••• Purpose: SSL, PDF [COM, PDF] Example: Main,PDF
Certificate creation	CreateCert	—
Touch screen calibration reset	ExecTouchCal	—
Initialize	Initialize	ss••• Initialize type [Security, Other, Data] (List of initialized settings. All for all settings.) Example: Security, Other, Data
Sign in	Sign In	l,ss••• l Level (1 to 3) ss••• File name
Module		
Reconfiguration	ConfigModule	—
Module disconnection	RemoveModule	Unit:uu,Slot:ss,mm•••,ii•••,vv••• u Unit s Slot mm••• Module name ii••• Serial number vv••• Version number Example: Unit00,Slot:01,GX90XA-10-U2,0000,1,00.00
Modules installed	AttachModule	Unit:uu,Slot:ss,mm•••,ii•••,vv••• u Unit s Slot mm••• Module name ii••• Serial number vv••• Version number
Module information	InfoModule	Unit:uu,Slot:ss,dd•••,UU••• u Unit s Slot dd••• Calibration date (same format as the log date) UU••• Calibration user Example: Unit00,Slot:01,2013/06/05,User01
Module activation	ApplyModule	—

Operation	Event string	### information and detailed information
Module update	UpdateModule	Unit:uu,Slot:ss,mm•••,ii•••,vv••• u Unit s Slot mm••• Module name ii••• Serial number vv••• Version number
Setting changes during recording		
Alarm setting change	SetAlarm	cccc:l:(s,typ,val,hys,l,Otyp,Ono)=(b1,b2,b3,b4,b5,b6,b7)->(a1,a2,a3,a4,a5,a6,a7) c Channel l Level b1,•••,b7 Before change a1,•••,a7 After change The following settings (those that have been changed among the following seven settings) s On/Off [ON, OFF] typ Type [H,L,R,r,h,l,T,t] val Alarm value hys Hysteresis l Logging [ON, OFF] Otyp Output type [OFF,DO,SW] Ono Output number Example 1: 0001:1:(s,typ,val,hys,l,Otyp,Ono)=(off,TH,off,-2.000,0.0005,DO,0001)->(off,TL,off,-2.000,0.0005,SW,001) Example 2: 0002:2:(val)=(-2.000)->(-1.000)
Alarm delay setting change	SetAlmDelay	cccc:(hour,min,sec)=(b1,b2,b3)->(a1,a2,a3) cccc Channel b1,b2,b3 Before change a1,a2,a3 After change The following settings (those that have been changed among the following three settings) hour Delay hour min Delay minute sec Delay second Example: A100:(hour,min,sec)=(00,00,00)->(01,02,03)
Calibration correction/set point change	SetCCModePnt	cccc:(mode,num)=(b1,b2)->(a1,a2) c Channel b1,b2 Before change a1,a After change The following settings (those that have been changed among the following two settings) mode Mode [OFF, Bias, Appro] num Number of set points Example: 0001:(mode,num)=(OFF,3)->(Appro,12)
Calibration correction value change	SetCCValue	cccc:pp:(input,output)=(b1,b2)->(a1,a2) c Channel p Set number b1,b2 Before change a1,a2 After change The following settings (those that have been changed among the following two settings)

Operation	Event string	### information and detailed information
		input Calibration correction value output Output calibration value Example: 0001:02:(output)=(1.234)->(2.234)
Save directory change	SetDirectory	(b1)->(a1) Folder name Example: (DATA0)->(DATA1)
Recipient address change	SetRecipient	Recipient:I I Recipient number [1, 2] Example: Recipient:1
Source address change	SetSender	—
Subject change	SetSubject	—
Login change	SetLogin	User:UUU UUU User number
Change while recording is stopped		
Setting change	SetParameter	ss•••:kk••• ss••• Setting file name kk••• Setting change type [Security,Comm,I/OCh,MathCh,CommCh,Other] (list of changed settings) Example: 000111_131219_095412.GSL:Security,Comm,I/OCh,MathCh,CommCh,Other
Updating		
Other updates	Update###	### Action (output in the event string) Web Web application <Detailed information> vv••• vv... Version number

2.10.20 External Storage Medium and Internal Memory File List (FMedia)

The output in response to the command “FMedia,DIR” is shown below.

Syntax

```
EA<crlf>
yy/mm/dd_hh:mi:ss_lll…l_fff…<crlf>
yy/mm/dd_hh:mi:ss_<DIR>_ddddddddd…<crlf>
EN<crlf>
```

yyyy/mo/dd_hh:mm:ss	Time of file generation
	yy Year (1900 to 2099)
	mm Month (01 to 12)
	dd Day (01 to 31)
	hh Hour (00 to 23)
	mi Minute (00 to 59)
	ss Second (00 to 59)
lll…l	File size (fixed to 10 characters. Unused character positions are filled with spaces.) For directories, <DIR> is output.
fff…	File name

2.10.21 External Storage Medium Free Space (FMedia)

The output in response to the command “FMedia,CHKDSK” is shown below.

Syntax

```
EA<crlf>
zzzzzzz_Kbytes_free<crlf>
EN<crlf>
```

zzzzzzz	Free space (KB)

2.10.22 Setting Data (FCnf)

The output in response to the command “FCnf” is shown below.

Syntax

```
EA<crlf>
<Response to a setting query>
EN<crlf>
```

The setting data is output in the format of the response to a setting query.

2.10.23 Decimal Place and Unit Information (FChInfo)

The output in response to the command “FChInfo” is shown below.

Syntax

```
EA<crlf>
s_cccc_uuuuuuuuuu,pp<crlf>
s_cccc_uuuuuuuuuu,pp<crlf>
s_cccc_uuuuuuuuuu,pp<crlf>
EN<crlf>
```

s	Data status N Normal D Differential input S Skip
cccc	Channel number (I/O channel, math channel, communication channel)
uuuuuuuuuu	Unit information (fixed to 10 characters. Unused character positions are filled with spaces.)
pp	Decimal place (00 to 05) The decimal place of the mantissa on channels set to LOG scale (/LG)

2.10.24 System Configuration (FSysConf)

The output in response to the command “FSysConf” is shown below.

Syntax

When no expandable I/O is connected

```
EA<crlf>
Unit:00
00:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
01:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
02:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
03:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
04:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
05:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
06:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
07:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
08:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
09:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
EN<crlf>
```

When an expandable I/O or sub unit is connected

```
EA<crlf>
U00f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U01f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U02f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U03f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U04f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U05f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U06f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
Unit:nn
00:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
01:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
02:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
03:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
04:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
05:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
06:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
07:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
08:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
09:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
Unit:nn
00:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
01:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
02:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
03:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
04:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
05:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
06:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
07:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
08:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
09:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
:
Unit:nn
00:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
01:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
02:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
03:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
04:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
05:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
06:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
07:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
08:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
09:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
EN<crlf>
```

Output example when an expandable I/O or sub unit is connected

- The unit information area (e.g. U00) will contain the expansion module name. All seven units are output regardless of whether expansion modules are available.
- The module information area (after Unit) will contain I/O module names. Only the units that have modules installed will be output.

```
EA
U00*:GX20-1J          GX20-1J          ----------------
U01 :GX90EX-02-TP1    GX90EX-02-TP1    ----------------
U02 :---------------- ---------------- ----------------
U03 :---------------- ---------------- ----------------
U04 :---------------- ---------------- ----------------
U05 :---------------- ---------------- ----------------
U06 :---------------- ---------------- ----------------
Unit:00
00:GX90XA-10-U2     GX90XA-10-U2     ----------------
01:GX90XA-10-U2     GX90XA-10-U2     ----------------
02:---------------- ---------------- ----------------
03:---------------- ---------------- ----------------
04:---------------- ---------------- ----------------
05:---------------- ---------------- ----------------
06:---------------- ---------------- ----------------
07:---------------- ---------------- ----------------
08:---------------- ---------------- ----------------
09:---------------- ---------------- ----------------
Unit:01
00:GX90XA-10-U2     GX90XA-10-U2     ----------------
01:---------------- ---------------- ----------------
02:---------------- ---------------- ----------------
03:---------------- ---------------- ----------------
04:---------------- ---------------- ----------------
05:---------------- ---------------- ----------------
06:---------------- ---------------- ----------------
07:---------------- ---------------- ----------------
08:---------------- ---------------- ----------------
09:---------------- ---------------- ----------------
EN
```

`ccccccccccccccc` Module models that are actually installed
- `----------` Module not installed (16 hyphens)
- Displays the module model code.

`uuuuuuuuuuuuuuuu` Module models recognized by the GX
- `----------` Module not installed (16 hyphens)
- Displays the module model code.

`defghijklmnopqrs` Module status
- `-` Normal
- `x` Error
- d to s express the following items.
  - `d` System data error
  - `e` Calibration value error
  - `f` Parameter error
  - `g` Reserved (-)
  - `h` FRAM error
  - `i` Reserved (-)
  - `j` Reserved (-)
  - `k` Reserved (-)
  - `l` A/D error
  - `m` RJC error
  - `n` Reserved (-)
  - `o` Reserved (-)
  - `p` Reserved (-)
  - `q` Reserved (-)
  - `r` Reserved (-)
  - `s` Reserved (-)

`nn` Unit number

`f`
- * GX/GP or GM main unit

	(Space) Expandable I/O or sub unit
DEFGHIJKLMNOPQRS	Expansion module status D to S express the following items. D System data error (-: normal, X: error) E Ethernet error (-: normal, X: error) F to S Reserved (-)

2.10.25 Bluetooth Device Information (FBTDevInfo)

The output in response to the command “FBTDevInfo” is shown below.

Syntax

```
EA<crlf>
(BD address),(module information)<crlf>
EN<crlf>
```

(BD address)	Format: xx:xx:xx:xx:xx:xx
(module information)	xxxx (user-defined character string)

Before the Bluetooth function is turned on after power-on, the xx of the BD address area will be spaces, and the module information area will be empty (no characters).

2.10.26 Instrument Manufacturer (_MFG)

The output in response to the command “_MFG” is shown below. Outputs the instrument manufacturer.

Output Example

```
EA<crlf>
YOKOGAWA<crlf>
EN<crlf>
```

2.10.27 Instrument’s Product Name (_INF)

The output in response to the command “_INF” is shown below.

Output Example

```
EA<crlf>
'GX20/GP20',123456789,xx-xx-xx-xx-xx-xx,Rx.xx.xx <crlf>
EN<crlf>
```

‘GX20/GP20’	Product name (‘GX20/GP20’, ‘GX10/GP10’, or ‘GM10’)
123456789	Product serial number
xx-xx-xx-xx-xx-xx	MAC address (xx’s are hexadecimals)
Rx.xx.xx	Firmware version

2.10.28 Instrument's Basic Specifications (_COD)

The output in response to the command "_COD" is shown below.

Output Example

```
EA<crlf>
'GX20',-1,J,1,M <crlf>
EN<crlf>
```

'GX20'	Model
-1	Type -1 100 channels -2 500 channels
J	Display language J Japanese E English C Chinese
1	Supply voltage Blank (when the product name is GX10, GX20, or GM10) 1 100 VAC, 240 VAC (when the product name is GP10 or GP20)
M	Power cord Blank (when the product name is GX10, GX20, or GM10) M PSE cable D UL/CSA cable F VDE cable R AS cable Q BS cable H GB cable N NBR cable

2.10.29 Instrument's Firmware Version Information (_VER)

The output in response to the command "_VER" is shown below.

Output Example

```
EA<crlf>
B999999,Rx.xx.xx,'Main Program'<crlf>
B999999,Rx.xx.xx, 'Web Program'<crlf>
EN<crlf>
```

B999999	Firmware part number (first line), Web program part number (second line)
Rx.xx.xx	Firmware version (first line), Web program version (second line)

2.10.30 Instrument's Option Installation Information (_OPT)

The output in response to the command "_OPT" is shown below.

Output Example

```
EA<crlf>
/C2,'RS-232'<crlf>
/C3, 'RS-422/485'<crlf>
/C8, 'Bluetooth'<crlf>
/D5, 'VGA output'<crlf>
/FL, 'Fail output (1 point) '<crlf>
/MT,'Mathematical function (with report function) '<crlf>
/MC, 'Communication channel function'<crlf>
/P1, '24 VDC/AC power supply'<crlf>
/UH, 'USB interface (Host 2 ports) '<crlf>
/U__0,'Model pre-installed with analog (universal) input
module(s)'<crlf>
/CR__,'Model pre-installed with digital output module(s) and/or
digital input module(s)'<crlf>
EN<crlf>
```

/C2	RS-232
/C3	RS-422/485
/C8	Bluetooth
/D5	VGA output
/FL	Fail output, 1 point
/MT	Math (including the report function)
/MC	Communication channel function
/P1	24VDC/AC power supply
/UH	USB interface (host 2 ports)
/AS	Advanced security function (Part 11 compliant)
/E1	EtherNet/IP communication
/E2	WT communication
/CG	Custom display function
/LG	Log scale
/UX$_1$X$_2$0	Model pre-installed with analog (universal) input modules
	X$_1$ Terminal type
	S Screw terminal
	C Clamp terminal
	X$_2$ Number of analog (universal) input modules installed
	1, 2, 3, 4, 5, 6, 7, 8, 9, A (where A represents 10)
/CRY$_1$Y$_2$	Model pre-installed with digital output modules and/or digital input modules
	Y$_1$ Number of digital output (C contact) modules installed
	1,2,3,4,5
	Y$_2$ Number of digital input modules installed
	1,2

2.10.31 Instrument's Temperature Unit and Daylight Saving Time Installation Information (_TYP)

The output in response to the command "_TYP" is shown below.

Output Example

```
EA<crlf>
DST,'Summer time/Winter time'<crlf>
DEGF,'degF'<crlf>
EN<crlf>
```

DST	Daylight saving time enabled
DEGF	Fahrenheit temperature unit enabled

2.10.32 Instrument's Error Number Information (_ERR)

The output in response to the command "_ERR" is shown below.

Output Example

```
EA<crlf>
10:1:2,'Dram Error'<crlf>
500:2:5,'Media Error'<crlf>
EN<crlf>
```

2.10.33 Instrument's Unit Configuration Information (_UNS or _UNR)

The output in response to the command "_UNS" or "_UNR" is shown below.

Syntax

```
EA<crlf>
p1,p2,p3,p4,p5,p6,p7,p8,p9,p10<crlf>
p1,p2,p3,p4,p5,p6,p7,p8,p9,p10<crlf>
…
EN<crlf>
```

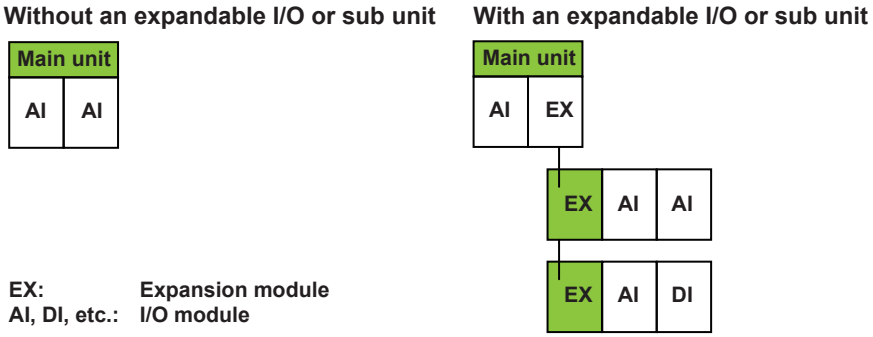
Output Example

```
EA<crlf>
Main,0,'GX20-1J',1234567,xx-xx-xx-xx-xx-xx,R1.01.01,/MT /C2,0,10,--
--------------<crlf>
Sub,1,'GX90EX-02-ET1',1234567,xx-xx-xx-xx-xx-xx,R1.01.01,,0,6,-----
-----------<crlf>
EN<crlf>
```

One line (p1 to p10) contains configuration information of a single unit.

p_n	Value	Description
p1	Main, Sub	Unit dependency (main or sub) information. Main: Main unit (Only a single one exists in a system. GX/GP or GM main unit) Sub: Sub unit (Units other than the main unit. GX/GP expandable I/O or GM sub unit)
p2	0,1	Unit address number. The address number of the main unit is 0.
p3	'GX20-1J', 'GX90EX-02-ET1'	Unit name (model name). Enclosed in single quotation marks. The main unit model or expansion module model in the expandable I/O unit or sub unit
P4	1234567	Product serial number.
p5	xx-xx-xx-xx-xx-xx	MAC address. xx = hexadecimal
p6	R1.01.01	Firmware version. The output format is "R+version."
p7	/MT /C2	Options. Codes of installed options delimited by spaces.
p8	0	Fixed at 0.
p9	6, 10	Maximum number of installable modules. If there are not installable modules, 0 is output.
p10	----------	Unit status. The unit status is output in a character string. See the **Expansion module status** in section 2.10.24, "System Configuration (FSysConf)."

The main unit and expansion module information is output (indicated in green below).



2.10.34 Instrument's Module Configuration Information (_MDS or MDR)

The output in response to the command "_MDS" or "_MDR" is shown below.

Syntax

```
EA<crlf>
p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11<crlf>
p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11<crlf>
…
EN<crlf>
```

Output Example

```
EA<crlf>
Main,0,1,'GX90YD-06-11',1234567,R1.01.01,,0,0,6,----------------
<crlf>
Main,0,9,'GX90EX-02-ET1'1234567,R1.01.01,,0,0,0,----------------
<crlf>
Sub,1,0,'GX90XA-10-U2',1234567,R1.01.01,,0,10,0,----------------
<crlf>
Sub,1,1,'GX90XA-10-U2',1234567,R1.01.01,,0,10,0,----------------
<crlf>
Sub,1,2,'GX90XA-10-U2',1234567,R1.02.01,,0,10,0,----------------
<crlf>
Sub,2,0,'GX90XA-10-U2',1234567,R1.02.01,,0,10,0,----------------
<crlf>
Sub,2,1,'GX90XD-16-11',1234567,R1.01.01,,0,16,0,----------------
<crlf>
EN<crlf>
```

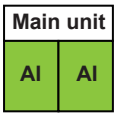
One line (p1 to p11) contains configuration information of a single module.

p_n	Value	Description
p1	Main, Sub	Unit dependency (main or sub) information. Main: Main unit (Only a single one exists in a system. GX/GP or GM main unit) Sub: Sub unit (Units other than the main unit. GX/GP expandable I/O or GM sub unit)
p2	0, 1, 2	Address number of the unit that the module is installed in. Fixed at 0.
p3	0, 1, 2	Slot number of the unit that the module is installed in (0 reference).
P4	'GX90YD-06-11', 'GX90EX-02-ET1', 'GX90XA-10-U2', 'GX90XD-16-11'	Module name (model name). Enclosed in single quotation marks. • All modules installed in the main unit • A module installed in an expandable I/O or sub unit (excluding the expansion module)
p5	1234567	Product serial number.
p6	R1.01.01, R1.02.01	Module firmware version. The output format is "R+version."
p7	Space	Options. Codes of installed options delimited by spaces.
p8	0	Fixed at 0.

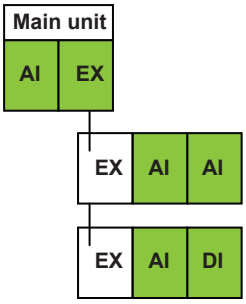
p_n	Value	Description
p9	0, 10, 8	Maximum number of input channels allowed on the module. If there are no inputs, 0 is output.
p10	0, 16	Maximum number of output channels allowed on the module. If there are no outputs, 0 is output.
p11	----------	Module status. The **Module status** is output in a character string.

The I/O module information is output (indicated in green below).

Without an expandable I/O or sub unit



With an expandable I/O or sub unit



EX: **Expansion module**
AI, DI, etc.: **I/O module**

2.11 Format of the Data Block of Binary Output

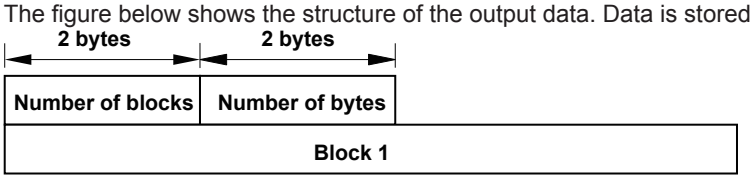
This section explains the data that is stored in the data block in the binary output of data output response.

2.11.1 Most Recent Channel Data (FData)

The output in response to the command “FData,1” is shown below. Outputs the most recent I/O channel, math channel, and communication channel data.

Configuration

The figure below shows the structure of the output data. Data is stored in “Block 1.”



Number of Blocks (16 bits)

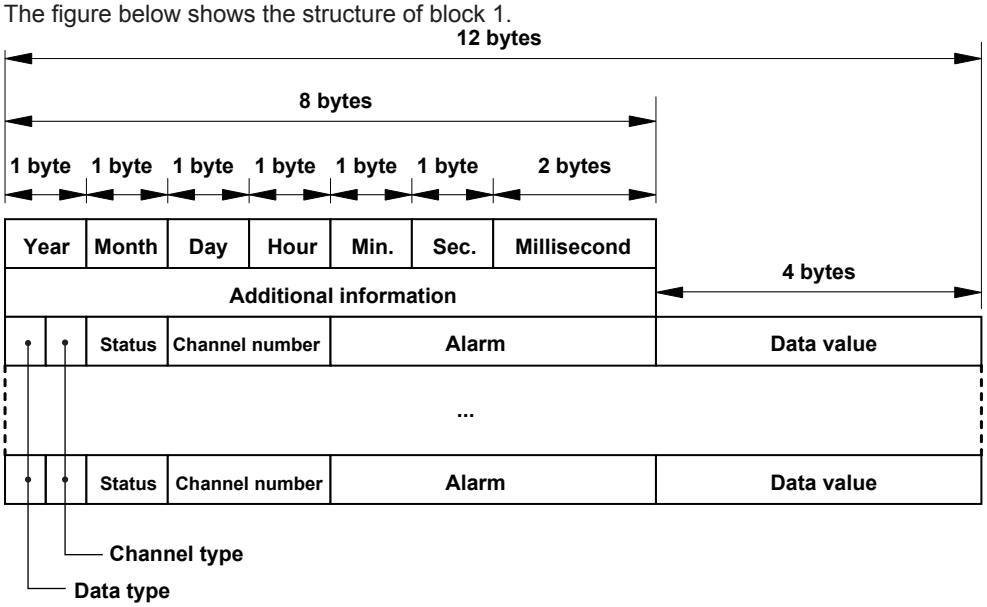
Always 1.

Number of Bytes (16 bits)

Stores the number of bytes of block 1.

Block 1

The figure below shows the structure of block 1.



Data Time

Item (Number of Bits)	Value
Year (8 bits)	0 to 99
Month (8 bits)	1 to 12
Day (8 bits)	1 to 31
Hour (8 bits)	0 to 23
Minute (8 bits)	0 to 59
Second (8 bits)	0 to 59
Millisecond (16 bits)	0 to 999

Additional Information (64 bits)

Bit 0: Daylight saving time (0: standard time; 1: daylight saving time)

Data Type (4 bits)

Indicates the data type. (1: 32 bit integer; 2: 32 bit floating point)
Data values for channels set to Log scale (/LG) are 32-bit floating-point type.

Channel Type (4 bits)

Indicates the channel type.

Value	Channel Type
1	I/O channel
2	Math channel
3	Communication channel

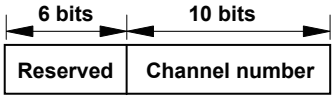
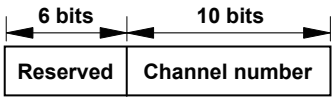
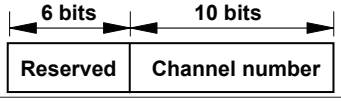
Status (8 bits)

Indicates the channel status.

Value	Channel Status
0	No error
1	Skip
2	+Over
3	-OVER
4	+Burnout
5	-Burnout
6	A/D error
7	Invalid data
16	Math result is NaN.
17	Communication error

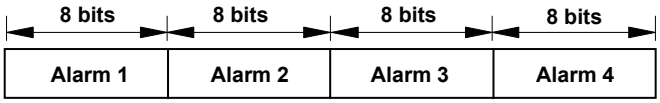
Channel Number (16 bits)

Indicates the channel number. Stored in the following manner depending on the channel type.

Channel Type	Channel Number
I/O channel	
Math channel	
Communication channel	

Alarm (32 bits)

Indicates the alarm status.



The eight bit values of alarm 1 to alarm 4 are described in the table below.

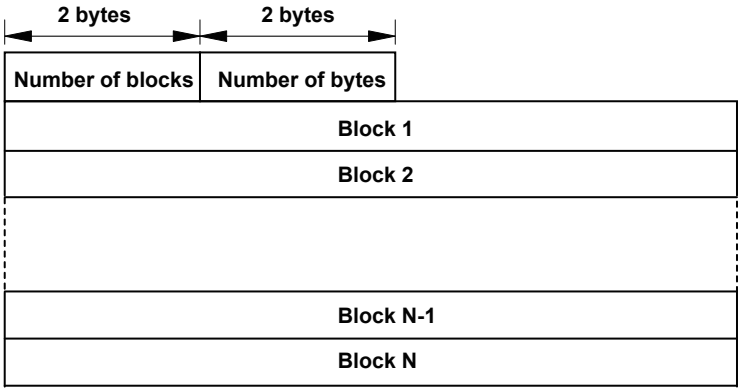
Bit	Value	Description
0 to 5	0	No alarm
	1	High limit alarm
	2	Low limit alarm
	3	Difference high limit alarm
	4	Difference low limit alarm
	5	High limit on rate-of-change alarm
	6	Low limit on rate-of-change alarm
	7	Delay high limit alarm
	8	Delay low limit alarm
6	0	No alarm is activated.
	1	An alarm is activated.
7	0	Alarm nonhold state
	1	Alarm hold state

2.11.2 Channel FIFO Data (FFifoCur)

The output in response to the command “FFifoCur,0” is shown below. Outputs the I/O channel, math channel, and communication channel FIFO data.

Configuration

Data is stored in “Block 1” shown below.



Number of Blocks (16 bits)

Number of stored blocks. Stores the number of blocks that can be output within the range specified by the read start position and end position.

Number of Bytes (16 bits)

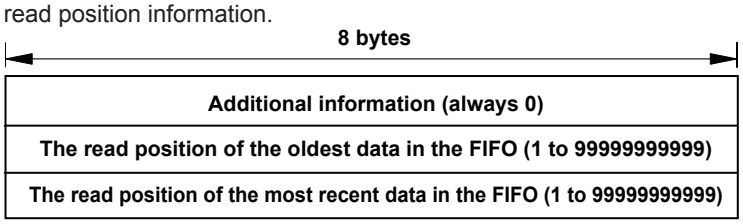
Stores the number of bytes per block.

Block

The content of the block is the same as that of “Block 1” described in section **“2.11.1 Most Recent Channel Data (FData)”**.

2.11.3 FIFO Data Read Range (FFifoCur)

The output in response to the command “FFifoCur,1” is shown below. Outputs FIFO data read position information.


8 bytes
Additional information (always 0)
The read position of the oldest data in the FIFO (1 to 99999999999)
The read position of the most recent data in the FIFO (1 to 99999999999)

The read position of the oldest data in the FIFO

This is the oldest data number within the readable data range.

The read position of the most recent data in the FIFO

This is the most recent data number within the readable data range.

Appendix 1 ASCII Character Codes

The ASCII character code table is shown below.

Lower 4 Bits \ Upper 4 Bits	0	1	2	3	4	5	6	7
0			SP (space)	0	@	P	‘	p
1			!	1	A	Q	a	q
2			“	2	B	R	b	r
3			#	3	C	S	c	s
4			$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			‘	7	G	W	g	w
8			(	8	H	X	h	x
9			)	9	I	Y	i	y
A	LF (line feed)		*	:	J	Z	j	Z
B		ESC	+	;	K	[	k	{
C			,	<	L	\	l	|
D	CR (return)		-	=	M	]	m	}
E			•	>	N	^	n	~
F			/	?	O	_	o	

Characters Used in Commands

In addition to alphanumeric characters, the following characters are used: commas as delimiters, semicolons as sub delimiters, question marks as query symbols, single quotation marks to indicate user-defined character strings, and “CR” (return) “LF” (line feed) as terminators.

Characters That Can Be Used in User-Defined Character Strings

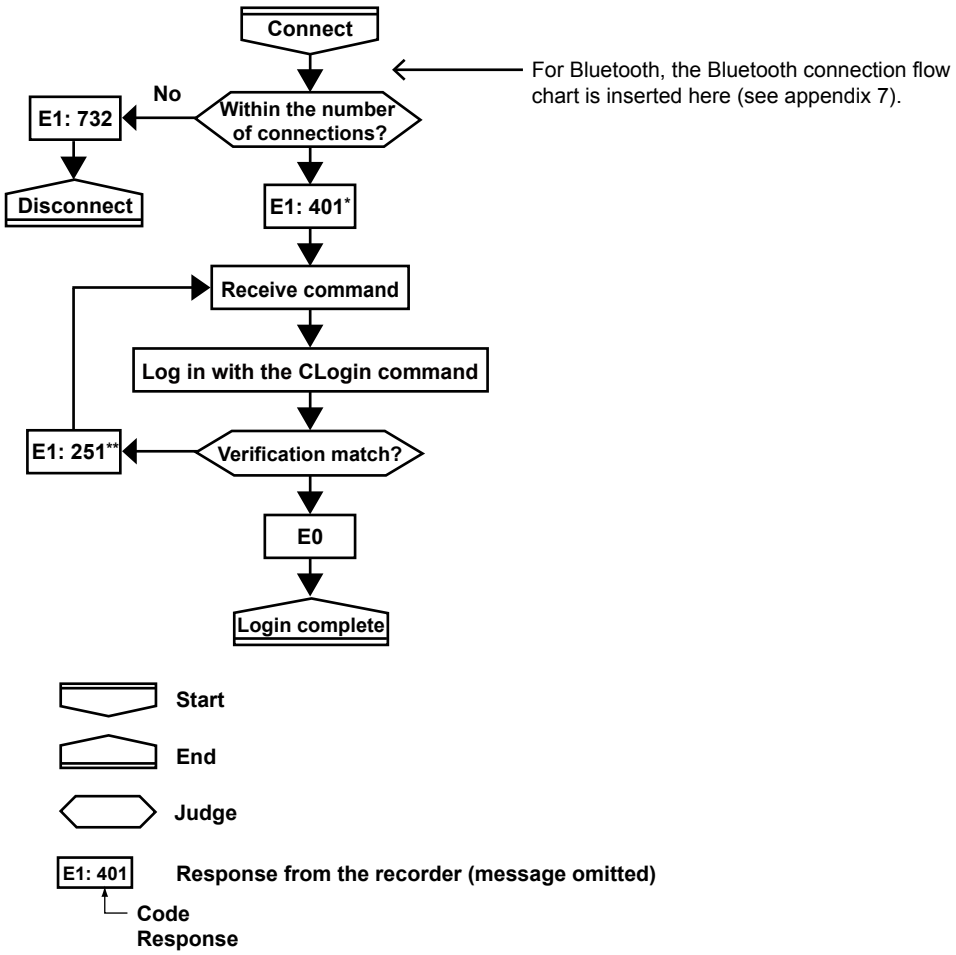
The table below shows the characters that can be used in user-defined character strings (tags, tag No., messages, etc.).

Item	Command and Parameter	Description
Directory name	p1 of the SDirectory command	The characters other than those in blue cells and those in thick frames can be used.
File name	p2 of the SFileName command	
Batch number	p2 of the OBatName command	
Password	p5 of SUser	The characters other than those in blue cells and SP (space) can be used.
	p1, p2, and p3 of OPassword	
	p2 of CLogin	
Character strings that users specify other than those above		The characters other than those in blue cells can be used.

Appendix 2 Login Procedure

To communicate using the general communication feature, you must log in to the recorder from your PC. If you complete the procedure successfully up to “Login complete” in the following figure, you will be able to use the commands.

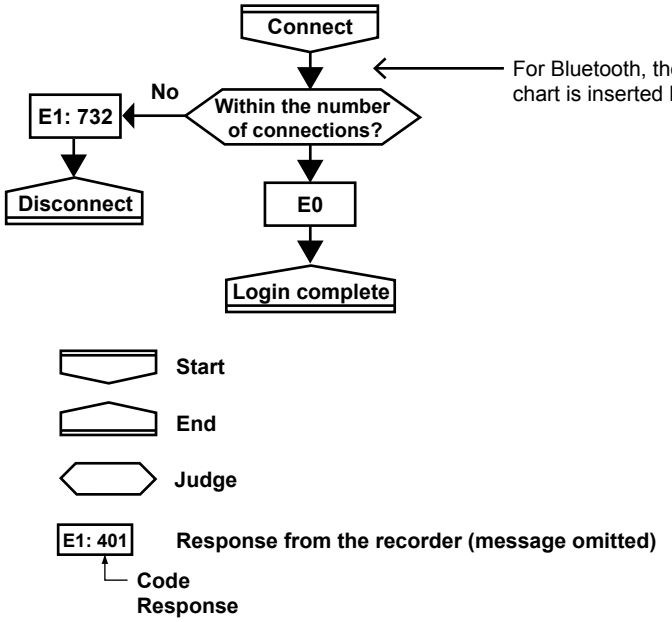
When Using the Login Function



* “E1:402” is returned when the advanced security function (/AS) is enabled.

** If the format of the CLogin command is not correct, verification is not performed, and an error code indicating the error is returned.
The following error code is returned when the advanced security function (/AS) is enabled.
251, 262, 263, 264, 265, 272, 273, 767
When the password management is in use, the following error code is returned in addition to the error code above.
004,252,261,651,657,760,761,762,763,764,765,766,768,769,770,771,772,773,774,775

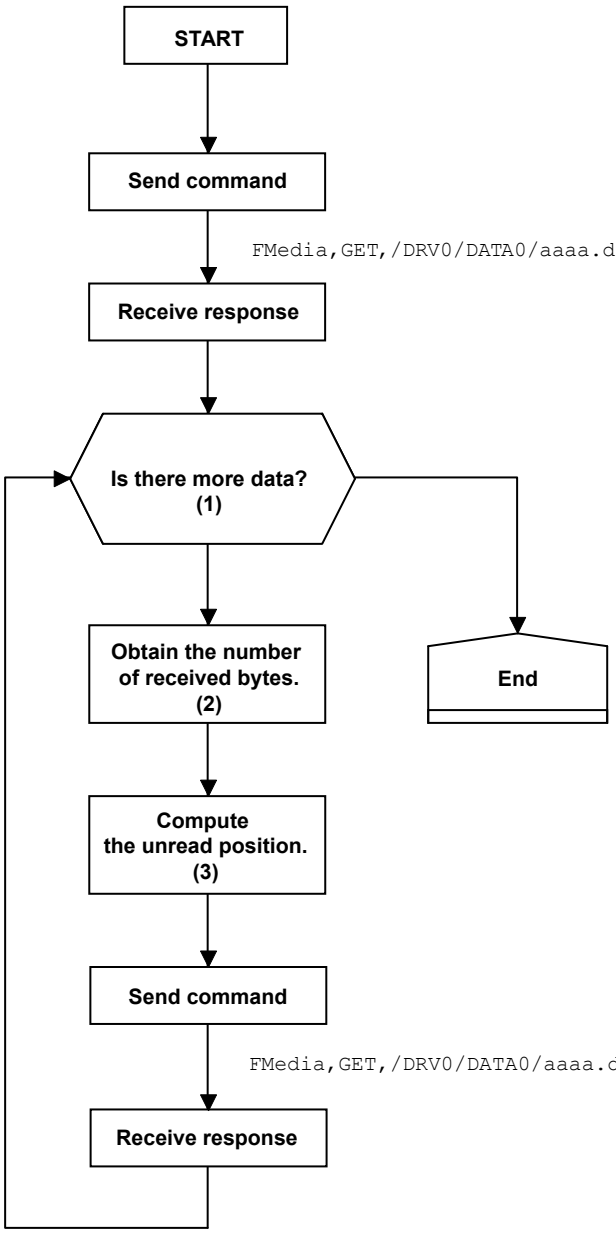
When Not Using the Login Function



Appendix 3 Output Flow Chart of External Storage Medium Files and File Lists

Example for Outputting File aaaa.dtd

The flow chart for outputting file aaaa.dtd in the DATA0 directory on the external storage medium is shown below.



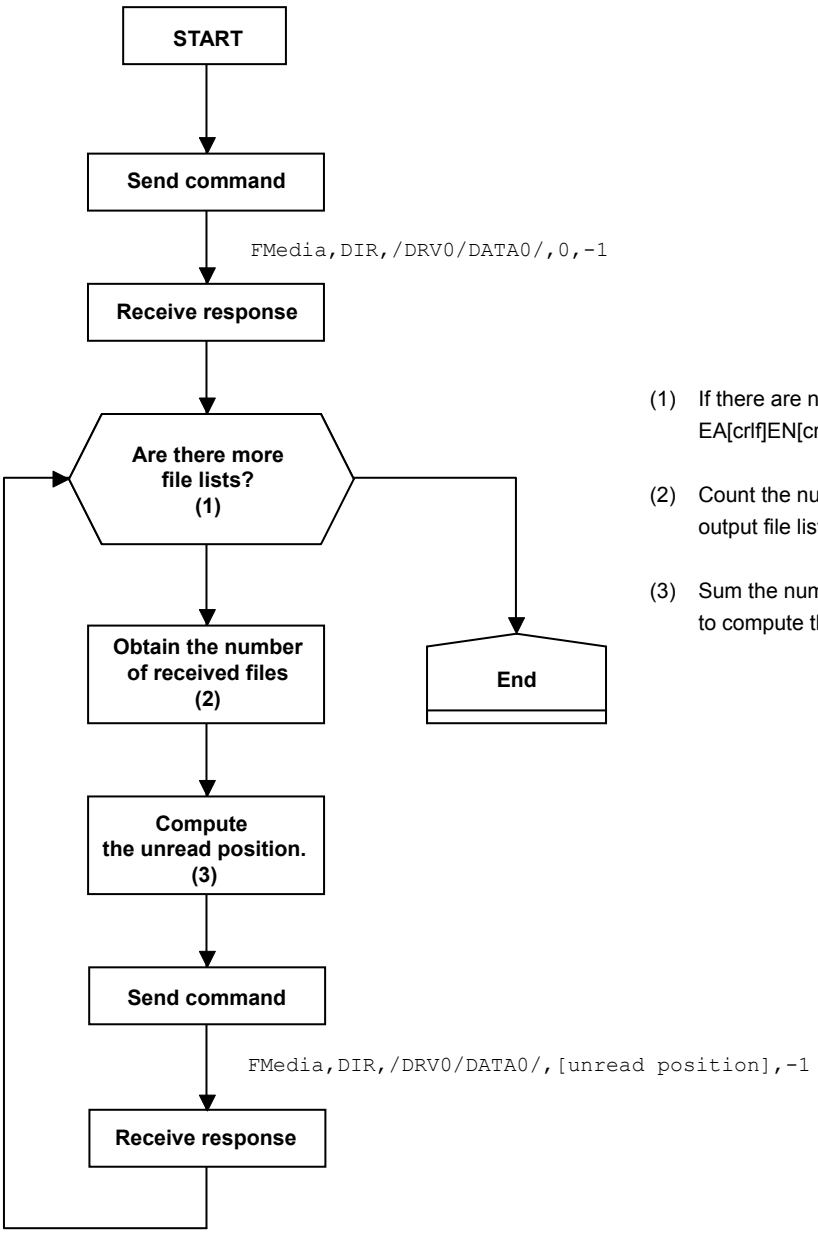
(1) If the binary header flag (bit 0) is 0, there is more data. If it is 1, data transmission is complete.

(2) From the data length of the binary output common header, obtain the number of received bytes.

(3) Sum the number of received bytes, compute the unread position.

Example for Outputting a File List

The flow chart for outputting the list of files in the DATA0 directory on the external storage medium is shown below.



(1) If there are no more files, EA[crlf]EN[crlf] is output.

(2) Count the number of lines in the output file list.

(3) Sum the number of lines in the file lists to compute the unread position.

Appendix 4 FIFO Data Output Flow Chart

Overview of the FIFO Buffer

The recorder internal memory is equipped with a dedicated FIFO (First-In-First-Out) buffer for outputting measured data. Measured data is written to the buffer at every scan interval. The PC can continuously retrieve the most recent measured data from the FIFO buffer. The size of the internal memory allocated for the FIFO buffer varies depending on the model. The number of data entries that the FIFO buffer can store varies depending on the number of channels and scan interval. The number of data entries that the FIFO buffer can store and the data length can be determined with the following formula.

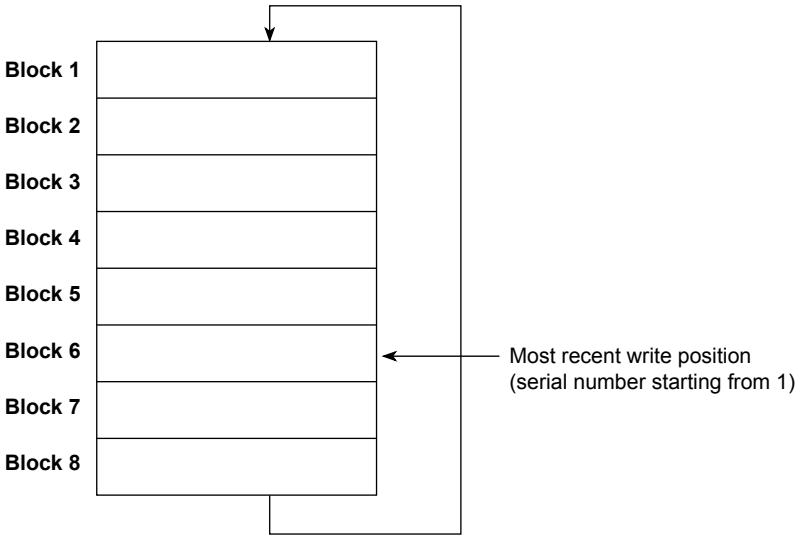
Data entries = 2000000 ÷ {16 + (12 × [number of channels])} (fractions truncated)

Data length = [data entries] × [scan interval]

Example If there are 10 I/O channels, 10 math channels, and 10 communication channels, and the scan interval is 100 ms, the number data entries will be 5319, and the data length will be 531.9 seconds or 8.865 minutes.

Example of FIFO Buffer Operation

The following example shows the case when the scan interval is 1 second and the FIFO internal memory size is for 8 scan intervals.



Writing of Measured Data in the FIFO Buffer

Writing to the FIFO buffer takes place every scan interval. If measured data is written to block 8, the most recent value will be written to block 1 in the next scan interval, overwriting the old value. This is called FIFO wraparound.

On the other hand, the most recent write position is managed using serial numbers starting with 1. The serial number does not return to 1 even when a FIFO wraparound occurs.

Reading Measured Data

The FFifoCur,0 command is used to read measured data. The read start position and read end position are specified using serial numbers. You can use the FFifoCur,1 command to read the serial numbers for the positions that data can be read from.

Appendix 5 Check Sum Calculation Method

The check sum of binary data is calculated using an algorithm like the one shown below.

```
int CalcSum(unsigned char *buf, int len)
{
  int    odd;
  unsigned long    sum;
  unsigned char    *p;

  sum = 0;
  odd = len & 1;
  len >>= 1;

  for (p = buf ; len ; len --, p += 2)
  {
    sum += (*p << 8) | *(p + 1);
  }

  if (odd)   sum += (*p << 8);

  sum = (sum & 0xffff) + ((sum >> 16) & 0xffff);
  if (sum > 0xffff)              sum = sum - 0xffff;

  return ((~sum) & 0xffff);
}
```

Appendix 6 Data Group Name and Data Name for WT Communication

The table below shows the parameters p5 (Data Group Name) and p6 (Data Name) for SWattData Command.

Parameters p5 (Data Group Name) and p6 (Data Name) for SWattData Command

WT1800

p5 (Data group name)	p6 (Data name)	Description	WT Function mark
Off	-	Data assignment is disabled.	-
ELEMENT1 to ELEMENT6	URMS	True rms voltage	Urms
	UMN	Rectified mean voltage calibrated to the rms value	Umn
	UDC	Simple voltage average	Udc
	IRMS	True rms current	Irms
	IMN	Rectified mean current calibrated to the rms value	Imn
	IDC	Simple current average	Idc
	P	Active power	P
	S	Apparent power	S
	Q	Reactive power	Q
	LAMBda	Power factor	λ
	PHI	Phase difference	φ
	FU	voltage frequency	fU
	FI	current frequency	fI
	TIME	Integration time	Time
	WH	sum of watt hours	WP
	WHP	Sum of positive P (consumed watt hours)	WP+
	WHM	Sum of negative P (watt hours returned to the power supply)	WP-
	AH	Sum of positive and negative ampere hours	q
	AHP	Sum of positive I (ampere hours)	q+
	AHM	Sum of negative I (ampere hours)	q–
ElemHrm1 to ElemHrm6	UK_1	RMS voltage of harmonic order 1	U(1)
	UK_T	Rms voltage	U(Total)
	IK_1	RMS current of harmonic order 1	I(1)
	IK_T	Rms current	I(Total)
	UTHD	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	ITHD	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
SigmaA to SigmaC	URMS	True rms voltage	Urms Σ [1]
	UMN	Rectified mean voltage calibrated to the rms value	Umn Σ
	IRMS	True rms current	Irms Σ
	IMN	Rectified mean current calibrated to the rms value	Imn Σ
	P	Active power	P Σ
	S	Apparent power	S Σ
	LAMBda	Power factor	λΣ
	PHI	Phase difference	φΣ
	WH	Sum of positive and negative watt hours	WP Σ
	WHP	Sum of positive P (consumed watt hours)	WP+ Σ
	WHM	Sum of negative P (watt hours returned to the power supply)	WP- Σ
	AH	Sum of positive and negative ampere hours	q Σ
	AHP	Sum of positive I (ampere hours)	q+ Σ
	AHM	Sum of negative I (ampere hours)	q- Σ

Continued on next page

Data group name	Data name	Description	WT Function mark
Other	ETA1	Efficiency 1	η 1
	ETA2	Efficiency 2	η 2
	ETA3	Efficiency 3	η 3
	ETA4	Efficiency 4	η 4
	F1	User-defined function 1	F1
	F2	User-defined function 2	F2
	F3	User-defined function 3	F3
	F4	User-defined function 4	F4
	F5	User-defined function 5	F5
	F6	User-defined function 6	F6
	F7	User-defined function 7	F7
	F8	User-defined function 8	F8
	F9	User-defined function 9	F9
	F10	User-defined function 10	F10
	F11	User-defined function 11	F11
	F12	User-defined function 12	F12
	F13	User-defined function 13	F13
	F14	User-defined function 14	F14
	F15	User-defined function 15	F15
	F16	User-defined function 16	F16
	F17	User-defined function 17	F17
	F18	User-defined function 18	F18
DeltaA to DeltaC	DU1	Delta computation voltage 1	Δ U1
	DU2	Delta computation voltage 2	Δ U2
	DU3	Delta computation voltage 3	Δ U3
	DUS	Delta computation wiring voltage	Δ U Σ
	DI	Delta computation current	Δ I
	DP1	Delta computation power 1	Δ P1
	DP2	Delta computation power 2	Δ P2
	DP3	Delta computation power 3	Δ P3
	DPS	Delta computation wiring power	Δ P Σ
Motor	SPEED	Motor rotating speed	Speed
	TORQUE	Motor torque	Torque
	SYNCSP	Synchronous speed	SyncSp
	SLIP	Slip (%)	Slip
	PM	Mechanical output of the motor (mechanical power)	Pm
Aux	Aux1	Auxiliary input 1	Aux1
	Aux2	Auxiliary input 2	Aux2

1 Will become ΣA, ΣB, or ΣC depending on the WT1800 wiring type.

WT500

Data group name	Data name	Description	WT Function mark
Off	-	Data assignment is disabled.	–
ELEMENT to ELEMENT3	URMS	True rms voltage	Urms
	UMN	Rectified mean voltage calibrated to the rms value	Umn
	UDC	Simple voltage average	Udc
	URMN	Rectified mean voltage	Urmn
	UAC	AC component	Uac
	IRMS	True rms current	Irms
	IMN	Rectified mean current calibrated to the rms value	Imn
	IDC	Simple current average	Idc
	IRMN	Rectified mean current	Irmn
	IAC	AC component	Iac
	P	Active power	P
	S	Apparent power	S
	Q	Reactive power	Q
	LAMBda	Power factor	λ
	PHI	Phase difference	φ
	FU	Voltage frequency	fU
	FI	Current frequency	fI
	UPPeak	Maximum voltage	U+pk
	UMPeak	Minimum voltage	U-pk
	IPPeak	Maximum current	I+pk
	IMPeak	Minimum current	I-pk
	CFU	Voltage crest factor	CfU
	CFI	Current crest factor	CfI
	TIME	Integration time	Time
	WH	Sum of positive and negative watt hours	WP
	WHP	Sum of positive P (consumed watt hours)	WP+
	WHM	Sum of negative P (watt hours returned to the power supply)	WP-
	AH	Sum of positive and negative ampere hours	q
	AHP	Sum of positive I (ampere hours)	q+
	AHM	Sum of negative I (ampere hours)	q-
	WS	Volt-ampere hours	WS
	WQ	Var hours	WQ
ElemHrm1 to ElemHrm3	UK_0	Rms voltage of harmonic order 0	U(0)
	UK_1	Rms voltage of harmonic order 1	U(1)
	UK_T	Rms voltage	U(Total)
	IK_0	Rms current of harmonic order 0	I(0)
	IK_1	Rms current of harmonic order 1	I(1)
	IK_T	Rms current	I(Total)
	PK_0	Active power of harmonic order 0	P(0)
	PK_1	Active power of harmonic order 1	P(1)
	PK_T	Active power	P(Total)
	SK_0	Apparent power of harmonic order 0	S(0)
	SK_1	Apparent power of harmonic order 1	S(1)
	SK_T	Total apparent power	S(Total)
	QK_0	Reactive power of harmonic order 0	Q(0)
	QK_1	Reactive power of harmonic order 1	Q(1)
	QK_T	Total reactive power	Q(Total)
	LAMBDA0	Power factor of harmonic order 0	λ (0)
	LAMBDA1	Power factor of harmonic order 1	λ (1)
	LAMBDAT	Total power factor	λ (Total)
	PHIK_1	Phase difference between the voltage and current of harmonic order 1	φ (1)
	PHIK_T	Total phase difference	φ (Total)

Continued on next page

Data group name	Data name	Description	WT Function mark
ElemHrm1 to ElemHrm3	PHIUk3	Phase difference between harmonic voltage U(3) and the fundamental signal U(1).	φ U(3)
	PHIIk3	Phase difference between harmonic current I(3) and the fundamental signal I(1).	φ I(3)
	UTHD	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	ITHD	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
	PTHD	Ratio of the total harmonic active power to P(1) or P(Total)	Pthd
SigmaA	URMS	True rms voltage	Urms Σ
	UMN	Rectified mean voltage calibrated to the rms value	Umn Σ
	UDC	Simple voltage average	Udc Σ
	URMN	Rectified mean voltage	Urmn Σ
	UAC	AC component	Uac Σ
	IRMS	True rms current	Irms Σ
	IMN	Rectified mean current calibrated to the rms value	Imn Σ
	IDC	Simple current average	Idc Σ
	IRMN	Rectified mean current	Irmn Σ
	IAC	AC component	Iac Σ
	P	Active power	P Σ
	S	Apparent power	S Σ
	Q	Reactive power	Q Σ
	LAMBda	Power factor	λΣ
	PHI	Phase difference	φΣ
	WH	Sum of positive and negative watt hours	WP Σ
	WHP	Sum of positive P (consumed watt hours)	WP+ Σ
	WHM	Sum of negative P (watt hours returned to the power supply)	WP- Σ
	AH	Sum of positive and negative ampere hours	q Σ
	AHP	Sum of positive I (ampere hours)	q+ Σ
	AHM	Sum of negative I (ampere hours)	q- Σ
	WS	Integrated value of SΣ	WS Σ
	WQ	Integrated value of QΣ	WQ Σ
Other	ETA1	Efficiency 1	η 1
	ETA2	Efficiency 2	η 2
	F1	User-defined function 1	F1
	F2	User-defined function 2	F2
	F3	User-defined function 3	F3
	F4	User-defined function 4	F4
	F5	User-defined function 5	F5
	F6	User-defined function 6	F6
	F7	User-defined function 7	F7
	F8	User-defined function 8	F8
Delta	DELTA1	Delta computation 1	Δ F1
	DELTA2	Delta computation 2	Δ F2
	DELTA3	Delta computation 3	Δ F3
	DELTA4	Delta computation 4	Δ F4
Phase	PHI_U1U2	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental voltage of element 2, U2(1)	φ U1-U2
	PHI_U1U3	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental voltage of element 3, U3(1)	φ U1-U3
	PHI_U1I1	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 1, I1(1)	φ U1-I1

Continued on next page

Data group name	Data name	Description	WT Function mark
Phase	PHI_U1I2	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 2, I2(1)	φ U1-I2
	PHI_U1I3	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 3, I3(1)	φ U1-I3

WT300

Data group name	Data name	Description	WT Function mark
Off	-	Data assignment is disabled.	–
ELEMENT1 to ELEMENT3	U	voltage	U
	I	current	I
	P	active power	P
	S	apparent power	S
	Q	reactive power	Q
	LAMBda	power factor	λ
	PHI	phase difference	φ
	FU	voltage frequency	fU
	FI	current frequency	fI
	UPPeak	Maximum voltage	U+pk
	UMPeak	Minimum voltage	U-pk
	IPPeak	Maximum current	I+pk
	IMPeak	Minimum current	I-pk
	PPPeak	Maximum active power	P+pk
	PMPeak	Minimum active power	P-pk
	TIME[1]	Integration time	Time
	WH	sum of watt hours	WP
	WHP	Sum of positive P (consumed watt hours)	WP+
	WHM	Sum of negative P (watt hours returned to the power supply)	WP-
	AH	Sum of positive and negative ampere hours	q
	AHP	Sum of positive I (ampere hours)	q+
	AHM	Sum of negative I (ampere hours)	q-
ElemHrm1 to ElemHrm3	UK_1	RMS voltage of harmonic order 1	U(1)
	UK_T	Rms voltage	U(Total)
	IK_1	RMS current of harmonic order 1	I(1)
	IK_T	Rms current	I(Total)
	PK_1	Active power of harmonic order 1	P(1)
	PK_T	Active power	P(Total)
	LAMBDA1	Power factor of harmonic order 1	λ (1)
	PHIK_1	Phase difference between the voltage and current of harmonic order 1	φ (1)
	PHIUk3	Phase difference between harmonic voltage U(3) and the fundamental signal U(1).	φ U(3)
	PHIIk3	Phase difference between harmonic current I(3) and the fundamental signal I(1).	φ I(3)
	UTHD	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	ITHD	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
	Uhdf_1	relative harmonic content of harmonic voltage of order 1	Uhdf(1)
	Ihdf_1	relative harmonic content of harmonic current of order 1	Ihdf(1)
	Phdf_1	relative harmonic content of harmonic power of order 1	Phdf(1)
	FPLL[2]	Current frequency or voltage frequency of PLL source	fPLL

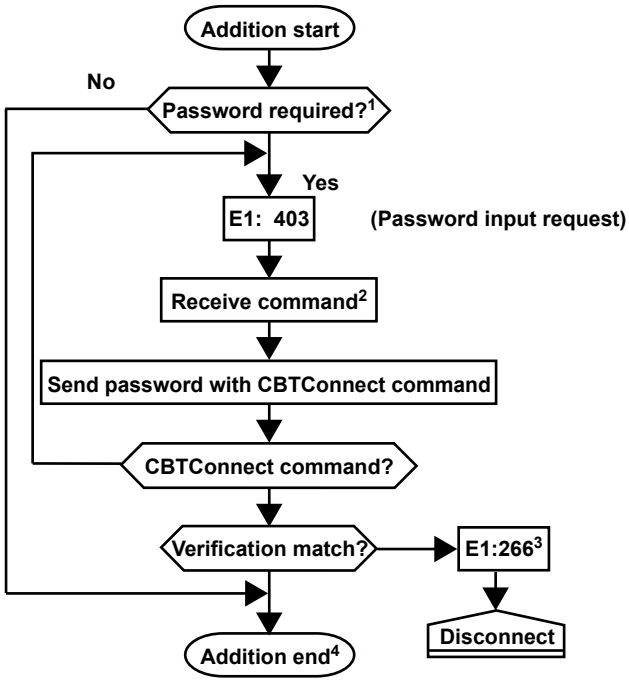
Continued on next page

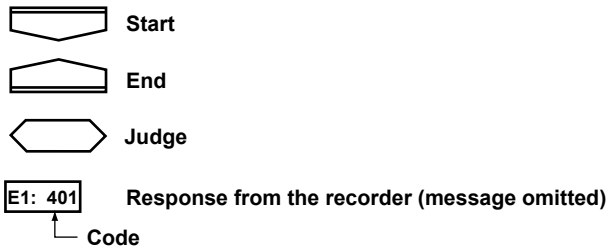
Data group name	Data name	Description	WT Function mark
SigmaA	U	voltage	U Σ
	I	current	I Σ
	P	active power	P Σ
	S	apparent power	S Σ
	Q	reactive power	Q Σ
	LAMBda	power factor	λΣ
	PHI	phase difference	φΣ
	WH	Sum of positive and negative watt hours	WP Σ
	WHP	Sum of positive P (consumed watt hours)	WP+ Σ
	WHM	Sum of negative P (watt hours returned to the power supply)	WP- Σ
	AH	Sum of positive and negative ampere hours	q Σ
	AHP	Sum of positive I (ampere hours)	q+ Σ
	AHM	Sum of negative I (ampere hours)	q- Σ
Other	MATH	Computed value, such as efficiency	Math

1 "TIME" is valid only when the data group is "ELEMENT1."
2 "PFLL" is valid only when the data group is "ElemHrm1."

Appendix 7 Bluetooth Communication Connection Flow Chart

To compose the complete Bluetooth communication connection flow chart, in appendix 2, insert the following flow chart after “Connect” in the flow chart shown under “When Using the Login Function” when the communication login function is in use or “When Not Using the Login Function” when the function is not in use.





1 A Bluetooth password is required when the first terminal tries to establish a connection when the password usage is enabled.
2 If no input is received within 2 minutes of a password input request (E403), Bluetooth communication will be disconnected.
3 If an error occurs during the CBTConnect command check (the number of parameters, whether the command is a query, etc.), the flow chart sequence follows the same path as when the password verification fails.
4 The above sequence between “Addition start” and “Addition end” is not recorded in the general log.